

Five-Year Review Report

EPA Region 5 Records Ctr.



238866

Second Five-Year Review Report  
For  
Rasmussen Dump Site  
Livingston County  
Hamburg, Michigan

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## List of Acronyms

<u>ACRONYM</u>	<u>NAME OR TERM</u>
AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA/SARA	Comprehensive Environmental Response, Compensation and Liability Act/Superfund Amendments and Reauthorization Act of 1986 (Superfund)
CA	Cooperative Agreement (with MDEQ)
COC	Contaminants of Concern
CD	Consent Decree
HSL	Hazardous Substance List (chemicals)
MDNR	Michigan Department of Natural Resources
MDEQ	Michigan Department of Environmental Quality
NPL	National Priorities List
O&M	Operation and Maintenance
PDSLD	Probable Drum Storage, Leakage and Disposal Area
PFS	Phased Feasibility Study
ppb	Parts per Billion (concentration)
PRP	Potential Responsible Party
ROD	Record of Decision
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study

SOW	Statement of Work
TBC	To Be Considered
UAO	Unilateral Administrative Order
U.S. EPA	United States Environmental Protection Agency
VAS	Vertical Aquifer Sampling
VOC	Volatile Organic Compound

## Executive Summary

The purpose of a statutory five-year review is to evaluate whether a completed remedial action remains protective of human health and the environment where hazardous waste remains on-site at levels that do not allow for unlimited use and unrestricted exposure. The methods, findings, and conclusion of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and propose recommendations to address them.

U.S. EPA conducted this statutory five-year review under Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). The next five-year report is required five years from the date of this review.

This review will be placed in the Site files and local repositories for the Rasmussen Superfund Site at the following locations and be available for viewing during normal business hours:

Brighton District Library  
Off Grand River on Library Drive  
Brighton, Michigan

Hamburg City Library  
7225 Stone Street  
Hamburg, Michigan

U.S. EPA Region 5  
Region 5 Records Center-7<sup>th</sup> Floor  
77 West Jackson Boulevard  
Chicago, Illinois 60604

**Table 1 Five-Year Review Summary Form**

SITE IDENTIFICATION			
Site name ( <i>from WasteLan</i> ): Rasmussen Dump			
EPA ID ( <i>from WasteLan</i> ): MID 095 402 210			
Region: 5	State: Michigan	City/County: Hamburg/Livingston	
SITE STATUS			
NPL status: <input checked="" type="checkbox"/> Final    Deleted    Other (specify)			
Remediation status (choose all that apply): Under Construction <input checked="" type="checkbox"/> Operating Complete			
Multiple OUs: Yes <input checked="" type="checkbox"/> No		Construction completion date: September 25, 1995	
Has site been put into reuse? Yes <input checked="" type="checkbox"/> No			
REVIEW STATUS			
Lead agency: <input checked="" type="checkbox"/> EPA   State   Tribe   Other Federal Agency			
Author Name: Howard Caine			
Author Title: Remedial Project Manager		Author affiliation: U.S. EPA Region 5	
Review period: January 7, 2000 to August 28, 2005			
Date(s) of site inspection: November 9, 2004 (Ken Glatz)   June 27, 2005 (Howard Caine)			
Type of review: <div style="display: flex; justify-content: space-around;"> <span><input checked="" type="checkbox"/> Post-SARA</span> <span>Pre-Sara</span> <span>NPL-Removal Only</span> </div> <div style="display: flex; justify-content: space-around;"> <span>Non-NPL Remedial Action Site</span> <span>NPL State/Tribe-lead</span> </div> <div style="display: flex; justify-content: space-around;"> <span>Regional Discretion</span> </div>			
Review number:   1 (first) <input checked="" type="checkbox"/> 2 (second)   3 (third)   Other (specify)			
Triggering action: <div style="display: flex; justify-content: space-between;"> <span>Actual RA Onsite Construction at OU #1</span> <span>Actual RA Start at OU#_____</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Construction Completion</span> <span><input checked="" type="checkbox"/> Previous Five-Year Review Report</span> </div> <div style="display: flex; justify-content: space-between;"> <span>Other Specify</span> </div>			
Triggering action date ( <i>from WasteLan</i> ): Five-Year Report dated August 28, 2000			
Due date ( <i>five years after triggering action date</i> ): August 28, 2005			

**Issues:**

The Site needs to have an Institutional Control Study to ensure that the ICs that are in place are protective of human health and the environment.

**Recommendations and Follow-Up Actions:**

Continuing the quarterly groundwater monitoring program is necessary to evaluate the remedy on an ongoing basis. The monitoring network and sparging system will be modified as necessary to address any changes in the groundwater contaminant plumes.

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
ICs	An IC Study needs to be performed at the Site to ensure that ICs are protective of human health and the environment	PRPs	U.S. EPA	<b>February 28, 2005</b>	N	Y

**Protectiveness Statement(s):**

The remedy at Rasmussen Dump currently protects human health and the environment because the source of contamination has been removed, the dump has been capped, the contaminated groundwater remains on-site, and the ozone sparging system is functioning to reduce the contaminants of concern. However, in order for the remedy to be protective in the long-term, an institutional control study needs to be performed to ensure long-term protectiveness. The PRPs have provided U.S. EPA with a written commitment to perform an IC Study to assist in the evaluation of the long-term protectiveness of the ICs for the Rasmussen Site.

## **Five-Year Review Report**

### **I. Introduction**

#### **The Purpose of the Review**

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the reviews, if any, and propose recommendations to address them.

#### **Authority for Conducting the Five-Year Review**

The Agency is preparing this five-year review pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

#### **Who conducted the Five-Year Review**

Howard Caine, Remedial Project Manager (RPM) of The United States Environmental Protection Agency (U.S. EPA) Region 5 conducted this five-year review of the remedial actions implemented at the Rasmussen Landfill Site (Rasmussen) in Livingston County, Michigan. This review was conducted from November 2004 through August 2005. This report documents the results of the review. Ken Glatz, the previous RPM, commenced the Five-Year Review in November 2004.

## **Other Review Characteristics**

This is the second five-year review for the Rasmussen site. The triggering action for this review is the date of the previous five-year review, as shown in U.S. EPA's WasteLAN database: August 28, 2000. The review is being activated because there are hazardous substances, pollutants, or contaminants left on-site above levels that allow for unlimited use and unrestricted exposure.

## **II. Site Chronology**

**Table 2**

<b>Activity</b>	<b>Date</b>
Dumping of Wastes	1960's – 1977
Preliminary Investigations and Notifying PRPs of Investigation	1983- 1991
Site Proposed for NPL	12/30/82
Site Becomes Final on NPL	9/8/83
Action Memo	10/30/84
Removal	1/11/85
RI/FS	3/28/91
ROD	3/28/91
ESD	7/91
Remedial Design	3/16/95
PCOR	9/25/95
Remedial Action	11/27/96
First Five-Year Review	8/28/00
ROD Amendment	7/20/01

## **III. Background**

### **Physical Characteristics**

The Rasmussen property encompasses approximately 33 acres, situated south of an unpaved secondary road (Spicer Road), about 40 miles west of Detroit and 5 miles south of Brighton, in Green Oak Township, Livingston County, Michigan. Woods, open fields, and rural residences surround the property. The property owner and his family occupy two residences. An auto body ship/auto salvage yard is located on the northern portion of the property. The southern portion of the property was previously operated as a municipal/industrial landfill and as a gravel/sand borrow pit. The Rasmussen property is bounded by property owned by a relative to the east, and by the Spiegelberg Landfill Superfund Site to the west and south. The Spiegelberg property also has an active gravel mining operation.

## Geology

The Site is located in an area of glaciated terrain. Geologic features in the vicinity of the Site include glacial outwash plains, end and ground moraines, kames, and lake or bog filled depressional features. The Site is reportedly located on a kame. Kames typically consist of stratified sand and gravels, which are deposited in contact with glacial ice. The kame feature on Site is surrounded by terminal and ground moraines, which typically consist of poorly sorted and unstratified glacial deposits of clay, silt, sand, and gravel. These glacial drift deposits in the vicinity of the Site have a thickness ranging from approximately 150 to 180 feet. The glacial drift overlies older consolidated sedimentary bedrock of the Coldwater Shale Formation. The Formation is considered to be relatively impermeable. From a groundwater flow and contaminant transport point-of-view, the important stratigraphic units beneath the Site include the following: an upper aquifer unit; a confining clay unit; a lower aquifer unit; and the Coldwater Shale Formation.

The upper aquifer unit consists of layers of fine to coarse sand, sand and gravel, and clay and silt. The sand, and the sand and gravel layers contain varying amounts of silt and clay. The interbedding of these deposits at the Site is expected to reduce the effective vertical permeability compared to the horizontal permeability.

The confining clay unit, which is comprised of a silty clay, is believed to be continuous below the Site although it pinches out below the Site, to the west on the Spiegelberg Landfill Superfund Site. This clay unit, which confines the lower aquifer, varies in thickness from approximately 30 feet to 50 feet and exists roughly between elevations 90 feet above means sea level (AMSL) and 840 feet AMSL.

The lower aquifer unit, which is situated below the confining clay, is a sand unit similar to the upper aquifer unit. This unit directly overlies the weathered blue clays of the Coldwater Shale Formation.

## Groundwater

In general, the horizontal groundwater flow direction under natural conditions in the upper aquifer is directed from the south to slightly west of north. However, in the southwest portion of the Site, groundwater flow is in a northwesterly direction. The aquifer parameters of significance are as follows: the saturated thickness of the upper aquifer ranges from approximately 20 to 60 feet; the range of hydraulic conductivities varies from 40 to 100 feet/day for the upper aquifer; the average horizontal hydraulic gradient of the upper aquifer at the Site, under non-pumping conditions, ranged from 0.002 to 0.007 feet/foot; the average vertical hydraulic gradient was estimated at 0.2 feet/foot and was directed downward; and based on these values of 0.007 for the horizontal hydraulic gradient and a hydraulic conductivity of 50 feet/day for the upper aquifer, the average groundwater velocity, under natural (non-pumping) condition, was estimated to be 1.2 feet/day or 440 feet/year.

## **Land and Resource Use**

The Rasmussen property is located to the east of the adjacent Spiegelberg Landfill Superfund Site. Woods, open fields, and rural residences surround the Rasmussen property. Land neighboring the Site contains a mixture of commercial/residential, but primarily residential properties. An auto body shop/auto salvage yard is located on the northern portion of the property. The southern portion of the property was previously operated as a municipal/industrial landfill and as a gravel/sand borrow pit.

## **History of Contamination**

The Rasmussen Dump accepted domestic and industrial wastes during the 1960's and early 1970's, which formed a ridge-like crest across the southern portion of the Site and property. Drummed and other industrial wastes were also disposed of at other locations on-site. Numerous incidents of burning were reported during the dump's operation. Several attempts were made by the County and State to bring the Rasmussen Dump into compliance with State laws, but the dump was never properly capped and 'closed' prior to termination of landfill operations in 1977. Sand and gravel mining, which began after closure of the Dump in 1977, undermined the landfill and resulted in the redistribution of fill and drummed wastes.

## **Initial Response**

Low levels of groundwater contamination were detected in a 1981 study conducted by the Michigan Department of Natural Resources (MDNR); now known as the Michigan Department of Environmental Quality, (MDEQ). U.S. EPA's Field Investigation Team conducted a site inspection in 1982, and the Site was scored and placed on the federal National Priorities List (NPL) of hazardous waste sites in 1983.

The U.S. EPA and MNDR commenced a Remedial Investigation and Feasibility Study (RI/FS) at the site in 1984.

## **Removal Actions**

In October and November of 1984, the U.S. EPA Emergency Response Team removed roughly 3,000 drums of waste and 250 cubic yards of contaminated soils from the top and south face of the dump. Late in 1985, MDNR constructed an eight-foot high chain-link fence around an area, which had been determined to contain various organic chemicals, including low-level dioxins and PCBs.

The report of findings for the Remedial Investigation was issued in September of 1988. Based on the findings of the Remedial Investigation, the Agencies were able to delineate discrete areas of buried drums and contaminated soils. U.S. EPA issued an Administrative Order on Consent, under Section 106(a) of CERCLA, for the removal of the drums, wastes, and associated visibly contaminated soils from three of the soils areas—the Northeast Buried Drum (NEBD) Areas, Top of Landfill (TML) Area, and

Industrial Waste (IW) Area. Eleven PRPs signed the Order, which became effective on August 24, 1989. This second removal action began in December of 1989 and was completed in early 1990.

The Feasibility Study Report, prepared by MDNR, reviewed by U.S. EPA, and released for public comment on January 16, 1990, is also based on the finding of the Remedial Investigation and Risk Assessment Reports. Subsequent to the completion of the Feasibility Study, further soil boring investigation and analyses were conducted from December of 1989 through January of 1990, on the Probable Drum Storage, Leakage, and Disposal Area (PDSLD). The results of these investigations are detailed in a Technical Memorandum that have been added to the Administrative Record.

Potentially Responsible Parties (PRPs) were identified by U.S. EPA for the Rasmussen Site. A General Notice Letter was issued to the identified PRPs in September 1988. Special Notice Letters were issued to the PRPs on May 23, 1991. Pursuant to Section 117 of CERCLA, 42 U.S.C. §9617, U.S. EPA published a notice of the completion of the FS and of the Proposed Plan for remedial action on August 31, 1990, and provided an opportunity for public comment on the Proposed Plan from August 31, 1990, through October 31, 1990.

### **Basis for Taking Action**

Roughly 650 drums were unearthed and staged on-site pending disposal authority for removal activities. Waste screening prior to disposal indicated that the contents of three drums contained waste with a pH of 12 or greater. Preliminary flammability screening indicated that approximately half of the containers may have contained flammable contents. Composite samples (5 drums per composite) showed levels of PCBs as high as 270,000 ppm. Eighty percent of the composites showed detectable levels of PCBs. Eight containers were found to contain liquids. All excavated wastes were manifested as hazardous and transported to approved RCRA facilities.

Major contributing chemicals to the carcinogenic risks from dermal contact with site soils were as follow: PCBs and benzo(a) pyrene for the TML; PCBs for the IW; PCBs for the PDSLD; and dioxins for the NEBD. As noted previously, the drummed wastes and associated contaminated soils were removed from the IW, NEBD and TML areas of concern. Further remediation of these soils areas, however, was also required to mitigate the potential risk posed by the contaminated soils areas to groundwater. The 1989/1990 supplemental soils investigation showed the presence of contaminated soils in the PDSLD which is a current source of groundwater contamination. These findings provided more detail with regard to the threat posed by the PDSLD soils. Chemicals of concern were determined for the Rasmussen groundwater plume. The 20 chemicals of concern were those detected at levels in Remedial Investigation sample data, and which posed a potential risk to human health and the environment. The 20 chemicals of concern were:

**Table 3**

<b>Chemicals of Concern</b>		
acetone	benzene	bis(2-ethylhexyl)phthalate
2-butanone	cadmium	chlorobenzene
2-chlorophenol	1,1-dichloroethene	1,2-dichloroethene
ethylbenzene	isophorone	lead
2-methylphenol	4-methyl-2-pentanone	methylene chloride
toluene	1,1,1-trichloroethane	trichloroethene
vinyl chloride	xylene	

Although no individuals are directly ingesting contaminated groundwater from the Rasmussen site, the contamination could pose a health risk to potential receptors in the future. A significant amount of contaminated groundwater currently remains on-site and is expected to continue to migrate towards downgradient wells, thereby creating potential exposure routes for human receptors. The future possibility exists, as well, for groundwater use at the site. In order to protect public health and the environment, remediation of the groundwater resource is necessary. The NEBD, TML, and IW soils areas of concern posed potential risks to the groundwater resource, while the PDSLD area poses a current risk to the groundwater. Remediation of these four soils areas was necessitated by the risks posed to groundwater. Potential risks from direct dermal contact or from inhalation of airborne contaminants, when modeled, do not pose significant risk to human health.

#### **IV. Remedial Actions**

##### **Remedy Selection**

The remedial action selected by U.S. EPA to address the conditions at the Facility was embodied in the ROD that was executed on March 28, 1991, and for which the State has given its concurrence. The ROD was supported by an administrative record file that contained the documents and information upon which U.S. EPA based the selection of the response action. U.S. EPA determined that the selected response action set forth in the ROD protects human health, welfare, and the environment, meets the requirements of all Federal and State environmental laws, and is cost effective.

The following nine criteria, outlined in the NCP at Section 300.430(e)(9)(iii), were used to compare the alternatives presented in the Feasibility Study and to determine the most appropriate alternative for remediation of the soils and groundwater that is protective of human health and the environment, attains applicable or relevant and appropriate requirements (ARARs), is cost-effective and represents the best balance among the evaluating criteria. The nine criteria that were evaluated are:

- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Long-term Effectiveness and Permanence

- Reduction of Toxicity, Mobility or Volume through Treatment
- Short-term Effectiveness
- Implementability
- Cost
- Support Agency Acceptance
- Community Acceptance

The selected remedial action for this site included capping the waste in the TML and NEBD areas, and removing and disposing of waste drums unearthed during cap construction, off-site at a RCRA facility; ground water pumping and treatment using chemical precipitation followed by pH adjustment to remove metal contaminants, a biological treatment system to remove organic ground water contaminants, and air stripping and granular activated carbon to remove residual organic contaminants as necessary; discharging the treated groundwater on-site through a seepage basin in the IW and PDSLD areas to flush area soil; monitoring groundwater; continuing residential well sampling in conjunction with sampling for the adjacent Spiegelberg Superfund Site; and implementing institution controls including deed restrictions, and Site access restrictions such as fencing. The estimated capital cost for this remedial action was \$7,320,000, with an estimated annual cost of \$4,580,000.

### **Remedy Implementation**

The following paragraphs discuss the implementation of each aspect of the remedial action.

The March 29, 1991 ROD remedy included components as follows:

- a. Install a landfill cap meeting the requirements of Michigan Act 641;
- b. Procure and implement institutional controls/deed restrictions;
- c. Implement a Remedial Design Data Collection Program to confirm the site hydrogeologic characterization, and to conduct field tests and treatability studies for the purpose of Remedial Design;
- d. Construct a ground water extraction system to capture and extract ground water for treatment from the affected ground water zones;
- e. Construct a ground water treatment plant to treat the extracted ground water prior to discharge;
- f. Discharge the treated groundwater through a reinfiltration basin(s) to flush residual VOC contamination into the treatment extraction system;
- g. Construct fencing to secure the constructed treatment plant and landfill cover;
- h. Implement all operation, maintenance and monitoring activities for the completed Remedial Action activities including operation and maintenance of the ground water treatment plant; monitoring the progress of ground water remediation; maintenance and ground water monitoring of the capped landfill; and
- i. Implement a short term residential well monitoring program

The July 21, 2001 ROD Amendment included components as follows:

- a. Shut down of the ground water extraction/treatment facility/soil flushing;
- b. Install and operate a ground water contaminant destruction process (in-situ ozone/oxygen oxidization) to restore the ground water to MCLs or current Michigan Part 201 residential drinking water criteria;
- c. Prevent off-site migration of contaminants during the remedial treatment;
- d. Prevent plume expansion during the remedial treatment;
- e. Modify the ground water monitoring program to insure treatment progress. This will affect the monitoring well location(s), number of wells and sampling frequency;
- f. Eliminate the SVOC analysis requirement;
- g. Provide contingency plan(s). The contingency plan may include Monitored Natural Attenuation (MNA) if applicable;
- h. Continued operation and maintenance of the installed cap;
- i. Continued site security;
- j. Update the cleanup standards to be consistent with current state and federal standards.

The Rasmussen Dump ground water investigation, that was a part of the Remedial Investigation for the Site, included analysis for Organics, Inorganics, Pesticides, Polychlorinated Biphenyls (PCBs), and ground water quality indicators. The results were evaluated against existing State and Federal ground water quality standards and were discussed, in detail, in the RI Report that is part of the Administrative Record for the Rasmussen Site. At the time of the 1991 ROD, it was determined that there were 13 VOCs, 3 semi-VOCs, and 2 metals present in the soil that presented a threat to the ground water. These contaminants were shown on Table 1 of the 1991 ROD.

The remedy selected in the 1991 ROD was designed to treat contaminated ground water, prevent precipitation from entering the landfill, and minimize the potential for people or animals to come into direct contact with contaminants. The 1991 ROD called for the extraction of ground water to capture and halt the flow of the plume of contamination; removal of heavy metal contaminants by chemical precipitation; removal of several organic contaminants by biological treatment; removal of residual organic contaminants via air stripping and granular activate carbon (or other carbon adsorption methodology), discharge of treated water to the ground water via a seepage basin; monitoring ground water through a system of wells; implementing a process effluent sampling program to aid in determining the treatment system's effectiveness; installing fencing around the Site, and imposing deed restrictions. The ground water extraction and treatment system was commissioned in 1996 and was in operation until March 2000, a period of approximately 4 years. The operation of the ground water extraction treatment system has resulted in the reduction of the concentrations of the compounds of concern (COCs) to low levels, except for trichloroethene content near EW-107, an area recently updated through supplemental studies. In early 1997, however, it was apparent that the conditions in the 1991 ROD calling for "Extraction of ground water to capture and halt the flow of the plume" and "halting the migration of contamination" were not being met, based on

the hydraulic contour maps generated month for the site.

U.S. EPA's review of the PRPs ground water monitoring elevation data indicated a flow of ground water to the north-northeast, through the contaminated EW-104 area. This suggested that the ground water flow to the north-northeast was possibly contaminating the ground water between the plume of contamination and Spicer Road. The PRPs made several attempts in 1998 to eliminate flow to the north-northeast by adjusting the extraction well pumping rates at EW-102, EW-103 and EW-104. The adjustments, however, did not achieve the desired effect. The U.S. EPA requested that the PRPs characterize the ground water escaping to the north-northeast of the plume, and if necessary, take corrective action to address the flow through the plume to the northeast. Subsequently, the PRPs conducted the requested ground water investigations between the north edge of the 1991 ROD plume and Spicer Road. The results from these studies showed a small isolated pocket of Benzene and Vinyl Chloride contamination (slightly above clean up levels) near Spicer Road (Spicer road plume). These results prompted U.S. EPA to direct the PRPs to investigate additional possible remedial actions to comply with the 1991 ROD requirements. Subsequently, the PRPs developed and evaluated several remedial technologies, including the expansion of the existing ground water extraction system, to address the Spicer road plume. In mid-summer 1999, the PRPs submitted a proposal to install an in-situ ozone/oxygen oxidation system to treat all remaining residual contamination at the site. The purpose of the modified final remedy was to replace extraction and on-site treatment of contaminated groundwater with in-situ ozone/oxygen oxidation. The modified final remedy required the PRPs to implement a new in-situ oxidation/ozone treatment system to treat the residual ground water contamination at the Site, and to continue to monitor and assess ground water quality at the site to ensure that contaminated groundwater does not migrate off-site, and that the contaminated plumes were contained and treated. Implementation of this proposal, if successful, would quickly restore the ground water to the amended ROD clean up standards, based on the treatment effectiveness of in-situ ozone/oxygen oxidation at other Sites which have similar geology. The PRPs were allowed in March 2000 to proceed with the purchase, installation and testing of the in-situ ozone/oxygen oxidation system at their own financial risk, pending approval of the amended ROD. The existing ground water excavation/treatment and soil flushing system was shut down and put in standby status to allow the ground water to return to stable pre-treatment conditions, so that the modified remedy could be properly designed to treat the residual contamination. The in-situ oxidation system requires the modification of the existing monitoring system by adding two additional monitoring wells, and utilizing select existing wells, consistent with the in-situ oxidation requirements.

An additional requirement of the 1991 ROD was to demonstrate that the soil flushing no longer resulted in VOCs being flushed to the aquifer at concentrations above clean up values. The PRPs submitted three reports to demonstrate that this has occurred.

The modified final remedy included the following modifications:

- a. Shut down of the ground water extraction/treatment facility/soil flushing;

- b. Install and operate a ground water contaminant destruction process (in-situ ozone/oxygen oxidization) to restore the ground water to MCLs or current Michigan Part 201 residential drinking water criteria;
- c. Prevent off-site migration of contaminants during the remedial treatment;
- d. Prevent plume expansion during the remedial treatment;
- e. Modify the groundwater monitoring program to insure treatment progress. This affects the monitoring well location(s), number of wells and sampling frequency;
- f. Eliminate the SVOC analysis requirement;
- g. Provide contingency plan(s). The contingency plan may include Monitored Natural Attenuation (MNA), if applicable;
- h. Continued operation and maintenance of the installed cap;
- i. Continued site security;
- j. Update the cleanup standards to be consistent with current state and federal standards.

Ozone is a powerful oxidizer, and by injecting a mixture of ozone and oxygen into select zones of the contaminated plume(s), the remaining residual ground water contamination would be destroyed at lower cost and with greater removal efficiency than the ground water extraction and treatment process.

**Table 4**

<b>Clean-Up Levels (ug/l)</b>		
<b>Select VOC</b>	<b>Site-Specific (1991 ROD)</b>	<b>ROD Amendment</b>
Acetone	700	730
Benzene	1.2	5.0
2-butanone	350	13000
chlorobenzene	100	100
1,1-dichloroethene (total)	100	170
ethylbenzene	70	70
4-methyl-2-pentanone	350	1800
methylene chloride	5	5
toluene	800	790
1,1,1-trichloroethane	200	200
trichloroethene	3	5
vinyl chloride	1	2
xylene (total)	300	280
<b>Select SVOC</b>		
Bis(2-ethylhexyl)-phthalate	2	6.0
Isophorone	8	770
2-methylphenol	400	370
<b>Select Metals</b>		
Lead	5	4.0
Cadmium	4	5.0

The ROD Amendment values reflected current EPA drinking water standards (MCLs). MDEQ Part 201 cleanup criteria were used for those compounds where MCLs have not been set.

### **System Operations/Operation and Maintenance (O&M)**

Over the last five years, the Rasmussen Site has been in transition. The groundwater pump and treat system was shut down; an ozone sparging system was installed; and the ozone sparging system was refined due to plume conditions.

The details of this transition are in Section V. Progress Since Last Review, below.

### **V. Progress Since Last Review**

Over the last five years, the Rasmussen Site has been in transition. The groundwater pump and treat system was shut down; an ozone sparging system was installed; and the ozone sparging system was refined due to plume conditions.

#### **Groundwater Pump and Treat System**

The groundwater pump and treat system was in operation during the first quarter of 2000. The system was turned off on March 28, 2000 to prepare for the change in remedy to the ozone sparge system. Groundwater elevations were going to be monitored 30 and 60 days after the air stripper system was shut down. Sampling of the groundwater was to be continued after ground water equilibrium was verified. The ozone sparge system was purchased and was installed during this time with construction commencing on July 5, 2000.

#### **Ozone Sparge System**

The northern and central zones of the ozone sparge system were installed during the month of July 2000 and commenced operation in August 2000. Monitoring of these areas commenced and continues presently. The southern ozone sparging zone was installed in late October 2000 and concluded in November 2000, followed by initial monitoring of the new zone for a 30-day interval.

CRA requested, on October 13, 2000, to reduce monitoring frequency for the ozone sparge system at Rasmussen. U.S. EPA concurred in reducing the start-up monitoring from weekly to monthly, and reducing groundwater elevation monitoring from monthly to quarterly.

Sparging times were adjusted in the southern zone to address groundwater contamination. The duration of the ozone sparging in the southern zone was increased from one hour to two hours. The duration of ozone sparging at the northern and north-central sparge points were reduced from one hour to 30 minutes. The duration of the ozone sparging in

the central zone was not changed.

Results from Vertical Aquifer Sampling (VAS) revealed concentrations of vinyl chloride and benzene exceeding Part 201 DWC standards. After plume delineations were completed, nine new sparge wells, SW-22 through SW-30, were installed on November 26, 27 & December 2 through 6, 2002 in the vacant lot west of the Rasmussen farmhouse. The sparge wells would address the remediation of benzene and vinyl chloride in the northern plume.

#### Additional Programs

##### PDSLD/IW Area Infiltration Quantitative Analysis

The original remedial action at the Rasmussen Site included the infiltration of treated groundwater through the PDSLD/IW Area. The objective of this action was to limit or eliminate the impact at COCs leaching to the groundwater. In March 2000 (after 4.2 years of infiltration) the remedial action at the Site was revised, and infiltration was stopped. A re-infiltration area termination sampling program was conducted during the week of May 15, 2000.

Site-specific soil cleanup criteria for the protection of groundwater were developed using methods developed by MDEQ. These soil cleanup criteria values were compared to concentrations detected in soil samples taken at the Site prior to flushing. It was determined that only three compounds, ethylbenzene, toluene and xylene, were present in 1996 at concentrations exceeding the Site-specific soil cleanup criteria.

VLEACH, a one-dimensional finite-difference vadose zone leaching model was used to determine the probable concentrations of these compounds in the soil at the Site after 4.2 years of leaching. Two scenarios were performed; one using maximum concentrations of the compounds of concern at each sample elevation, and the other using average concentrations for surface samples and maximum values at depth. Both scenarios were conservative because maximum soil concentrations were used to represent the average soil concentrations at depth.

The results of the leaching simulations indicated that the concentrations of all compounds of concern were well below the Site-specific soil cleanup criteria throughout and do not adversely impact the theoretical soil profiles following the completion of flushing. Therefore, further leaching from the Site soil would not negatively affect the groundwater quality.

The remediation goals for the PLSLD/IW Area soil have been achieved.

##### Ozone Sparging System Refinements

After operating the Ozone Sparging System for approximately 2 years, the PRPs observed that there were changes in the configuration of the northern plumes and

recommended appropriate refinements to the operation of the Ozone Sparging System and Groundwater Remediation Monitoring Program.

The PRPs found that plumes beneath the former infiltration area and immediately west of the infiltration area had been eliminated. COC concentrations and the extent of contaminant plumes had also decreased in the vicinity of monitoring wells, CRA-RA-24 and CRA-RA-25, located north of the infiltration area. However, recent analytical data from groundwater samples collected at CRA-RA-22, located downgradient of the northern plumes, indicated increased concentrations of vinyl chloride.

The Groundwater Remediation Monitoring Program was designed to monitor the progress of groundwater remediation and was based on the plume configuration as of January 2000. Sentry wells, such as CRA-RA-22, had been sampled to monitor the downgradient margin of the plume. Preference was also given to sampling monitoring wells included in previous monitoring programs to provide continuity. Also, not all locations where COCs were present, such as in the vicinity of the former extraction wells, were included in the Groundwater Remediation Monitoring Program. Because the configuration of the plume had changed, it was necessary to refine the operation of the ozone sparging system and the wells included in the Groundwater Remediation Monitoring Program.

In order to address gaps in the monitoring data, the Rasmussen Site Remediation Group (RSRG) collected groundwater samples in addition to those collected during routine monitoring. For example, additional groundwater samples were collected from monitoring wells CRA-RA-22, TEMP-PZ-2, PZ-104, PZ-106 and EB-PZ-4 in April 2002. CRA-RA-22, TEMP-PZ-2 and PZ-104 were sampled to determine whether vinyl chloride was present downgradient of ozone sparge points SW-2 through SW-5. PZ-106 and EB-PZ-4 were sampled to confirm that concentrations of COCs beneath the former infiltration area continued to be below their respective Part 201 Drinking Water Criteria (DWC).

The Remedial Action Report (CRA, January 2001) states that "...once COCs at a particular monitoring well are below their respective Part 201 DWC for three successive monitoring rounds, a request will be made to U.S. EPA and MDEQ to cease ozone sparging at the appropriate sparge point(s)". It was requested that U.S. EPA and MDEQ give permission to cease sparging immediately at SW-1, SW8 through SW11 and at SW-13. SW-1 was designed to address infrequent detections of vinyl chloride at monitoring well 81-8. Vinyl chloride was not detected at 81-8 in the last three monitoring rounds. Because no COCs had been detected at concentrations in excess of their respective Part 201 DWC in groundwater samples from monitoring well CRA-RA-25 for three consecutive quarters, it was appropriate to cease sparging immediately at SW-8 through SW-11. Sparging at SW-13 was also terminated. No COCs in excess of Part 201 DWC had been detected at the corresponding monitoring well (EB-PZ-4) in three consecutive groundwater samples collected since February 2001.

Monitoring at CRA-RA-3, RA-MW-18D and RA-MW-22 was terminated because these sentry wells were far removed from the current plume limits. The Remedial Action Plan

stated that once ozone sparging has ceased, the well should be sampled during the next quarterly event, and if COCs were still below their respective Part 201 SEC, annual sampling may begin. Monitoring wells EB-PZ-4 and PS-106 were sampled one more time during the quarterly Groundwater Remediation Monitoring Program. If COCs were still not present after ozone sparging had ceased, it was proposed that annual monitoring be instituted at these wells. Monitoring well PZ-104 was added to the quarterly Groundwater Remediation Monitoring Program to provide additional information regarding groundwater quality in the vicinity of SW-6 and SW-7. The recent detections of vinyl chloride at CRA-RA-22 indicate that it was appropriate to add downgradient monitoring well TEMP-PZ-2 to the Groundwater Remediation Monitoring Program.

Because of the continued presence of vinyl chloride at CRA-RA-22, additional delineation of the extent of COCs in the vicinity of this well was appropriate. Five proposed vertical aquifer sampling (VAS) locations were proposed. These results would be used to determine if additional sparge points were needed to address the vinyl chloride in the vicinity of CRA-RA-22 and PZ-104.

U.S. EPA and MDEQ concurred with the above proposal on July 11, 2002.

#### Vertical Aquifer Sampling

Five VAS boreholes were completed at the top of the confining clay of the northern plume. Fifteen investigative groundwater samples were collected from VAS boreholes and were analyzed for TCL VOCs by Southern Petroleum Laboratories (SPL). Two compounds of concern (COCs), vinyl chloride and benzene, were detected at concentrations above their respective Part 201 Drinking Water Criteria (DWC). The distribution and examination of vinyl chloride in the vicinity of the northern plume showed the following:

- Vinyl chloride was present in concentrations that exceeded Part 201 DWC northwest of CRA-RA-22 at the location of VAS-19;
- The northern and eastern limits of the vinyl chloride near CRA-RA-22 were delineated by results from VAS-20 and VAS-21;
- The western limit of the vinyl chloride near CRA-RA-22 was delineated by the results from groundwater samples collected from monitoring well TEMP-PZ-2. TEMP-PZ-2 is screened from 70 to 80 feet below ground surface, which corresponded with the sample depths at VAS-19;
- The southern limit of the vinyl chloride in the vicinity of CRA-RA-22 was delineated by the results from VAS-18;
- Additional data were required to delineate the northeastern extent of vinyl chloride in the vicinity of CRA-RA-22 and VAS-19;
- Vinyl chloride was present at concentrations in excess of Part 201 DWC at the location of VAS-17;
- The eastern limit of vinyl chloride in the vicinity of VAS-17 was delineated by results from monitoring wells PZ-104 and RA-RA-23;
- The southern limit of vinyl chloride in the vicinity of VAS-17 was delineated by

- the results from monitoring well CRA-RA-2D; and
- Additional data collection activities were required to delineate the western and northern extent of vinyl chloride in the vicinity of VAS-17

The distribution and examination of benzene in the vicinity of the northern plume showed the following:

- Benzene was detected at concentration exceeding the Part 201 DWC at VAS-17;
- The eastern and southern limits of the benzene in the vicinity of VAS-17 were delineated by the results from groundwater samples collected at PZ-104 and CRA-RA-2D, respectively; and
- Additional data collection activities were required to delineate the western and northern extent of benzene in the vicinity of VAS-17.

The extent of vinyl chloride and benzene in the vicinity of VAS-17 required further delineation. Three boreholes, VAS-22, VAS-23 and VAS-24 were installed to further delineate the western and northern extent of COCs in the vicinity of VAS-17.

An additional borehole, VAS-25, was installed to delineate the northeastern extent of vinyl chloride in the vicinity of CRA-RA-22 and VAS-19.

The results from groundwater samples collected at VAS-22 through VAS-25 were evaluated to determine the most effective location for additional sparge points.

Mark Henry of the Michigan Department of Environmental Quality (MDEQ) was visiting the Site and recommended that the efficiency of the ozone sparging system could be improved by operating the sparging intermittently. This would avoid the inefficiency of repeatedly sparging “clean” groundwater in light of the groundwater velocity at the Site. Mr. Henry recommended that the ozone sparging operate on a one week on, one week off schedule which is slightly more conservative and appropriate, given the hydraulic conditions at the Site. Groundwater monitoring would continue to ensure that the sparging continues to be effective.

U.S. EPA and MDEQ concurred with the above proposal on September 23, 2002.

#### Vertical Aquifer Sampling Follow-up

Four VAS boreholes were completed to the base of the upper aquifer of the northern plume. Thirteen investigative groundwater samples were collected from the VAS boreholes and were analyzed for TCL VOCs.

Two compounds of concern (COCs), vinyl chloride and benzene, were detected at concentrations above their respective Part 201 Drinking Water Criteria (DWC). In addition to the findings above, the distribution and examination of vinyl chloride in the northern plume were as follows:

- The northern limit of the vinyl chloride at VAS-19 was delineated by the results from VAS-25;
- Northwest of VAS-17, the limit of vinyl chloride was defined by the results from monitoring well TEMP-PZ-1. TEMP-PZ-1 is screened from 70 to 80 ft bgs. This corresponds to the depths of groundwater samples collected from VAS-17, which had the highest concentration of benzene and vinyl chloride; and
- The western limit of the vinyl chloride in the vicinity of VAS-17 was delineated by the results from VAS-24.

In addition to the findings above, the distribution and examination of benzene in the vicinity of the northern plume showed the following:

- The northern and western limits of the benzene in the vicinity of VAS-17 were delineated by the results from VAS-22 and VAS-23, respectively.

The extent of the benzene plume in the vicinity of VAS-17 was fully delineated. The limits of the benzene plume were within the limits of the vinyl chloride plume. The extent of vinyl chloride in the vicinity of VAS-17 and CRA-RA-22 was delineated. No additional plume delineation was required at this time. In general, the combined plume extended further to the west than previously delineated.

Nine additional sparge wells were recommended to address the areas of highest detections within the vinyl chloride and benzene plumes. Two sparge wells (SW-21 and SW-22) were installed in the vicinity of VAS-17 and VAS-23 to address the benzene and vinyl chloride in this area. Three sparge wells (SW-23, SW-24 and SW-25) were installed in the vicinity of VAS-22 to remediate the vinyl chloride in this area. Four sparge wells (SW-26, SW-27, SW-28 and SW-29) were installed along the downgradient edge of the vinyl chloride plume north of CRA-RA-22 to remediate the vinyl chloride in the area and prevent any potential downgradient migration of this portion of the vinyl chloride plume.

Monitoring well CRA-RA-28 was installed to monitor the progress of groundwater remediation at the location of VAS-17, which had the highest concentrations of benzene and significant concentrations of vinyl chloride.

Monitoring well CRA-RA-29 was installed to monitor the downgradient edge of the vinyl chloride plume north of CRA-RA-22. The well was installed at the location of VAS-25, and serves as a sentry well north of the current limit of the vinyl chloride plume.

Monitoring well CRA-RA-30 was installed in the vicinity of former borehole VAS-3. VAS-3 was installed in 1999 during the delineation of the original northern vinyl chloride plume. Vinyl chloride was present in a groundwater sample collected from VAS-3 at a concentration of 3 ppb. This result delineated the northwestern fringe of the northern vinyl chloride plume. Sparge wells SW-3, SW-4 and SW-5 were installed upgradient of VAS-3 to address this portion of the plume. The nearest monitoring well in this portion of the plume is CRA-RA-24. The concentration of vinyl chloride has decreased from 25

ppb to 6 ppb in groundwater samples collected from CRA-RA-24 since ozone sparging was initiated. Groundwater samples collected from CRA-RA-30 will determine if a similar decrease in vinyl chloride concentrations has occurred at the location of former VAS-3. Monitoring well CRA-RA-30 is located midway between CRA-RA-24 and the Rasmussen water supply well.

U.S. EPA and MDEQ concurred with the above proposal on November 14, 2002.

*Additional Site Investigations (June 7, 2004)*

CRA found during scheduled monitoring in December 2003 that there was a need for additional investigative activities at the Site. CRA found that in the northern portion of the Site, vinyl chloride was present downgradient of the sparge well system and upgradient of the Rasmussen water supply well and that additional monitoring was needed. The southern plumes also had to be investigated to determine whether plume containment was optimal.

Vinyl chloride was not detected in monitoring wells CRA-RA-24 and CRA-RA-30 during the September 2003 sampling round in the northern plume. It was also not present in the three prior quarterly sampling events. As a result, nearby ozone sparge wells, SW-2 through SW-5, were shut down as per the protocol in the Updated Remedial Action Report (CRA, January 2001). Vinyl chloride was found in the above monitoring wells during December 2003 groundwater sampling at concentrations of 1 ug/l. As a result, ozone sparging was restarted at sparge wells SW-2 through SW-5 on January 31, 2004. Monthly groundwater samples were collected and vinyl chloride concentrations increased to 2 ug/l at CRA-RA-30 and appeared to be stable by February 2004. The vinyl chloride concentrations decreased to ND by February 2004. As a result, the Rasmussen water supply well was sampled on a monthly basis for VOCs for one quarter. After one quarter, the sampling frequency would be re-evaluated. In addition, monthly sampling for VOCs began at CRA-RA-24 and CRA-RA-30. This data would determine plume behavior upgradient of the Rasmussen water supply well in response to re-starting ozone sparging at SW-2 through SW-5. After one quarter, the sampling frequency would be re-evaluated.

Monitoring well CRA-RA-32 was installed to monitor vinyl chloride in the northern plume. The reasons for this are described, below.

*Additional Investigations (October 29, 2004) Northern Plume*

In September 2003 vinyl chloride was not present (method detection limit = 1ug/l) in the groundwater samples collected from CRA-RA-24 and CRA-RA-30. These results were consistent with three previous rounds of quarterly monitoring data. On October 30, 2003 nearby ozone sparge wells SW-2 through SW-5 were shut down as per the protocol outlined in the Updated Remedial Action Report (CRA, January 2001). Groundwater samples collected from monitoring wells CRA-RA-24 and CRA-RA-30 in December 2003 contained vinyl chloride at concentrations of 1 ug/l. In response to these detections,

ozone sparging was re-started at sparge wells SW-2 through SW-5 on January 31, 2004.

Monthly sampling of the Rasmussen water supply well, CRA-RA-24 and CRA-RA-30 was conducted from May 2004 through August 2004 to determine if the ozone sparging was reducing the concentration of vinyl chloride in the vicinity of CRA-RA-24 and CRA-RA-30.

Analytical results from groundwater samples collected in May through August 2004 indicated vinyl chloride concentrations at CRA-RA-30 peaked at 3 ug/l in May 2004 and then decreased to 1 ug/l by August 2004. However, the September 2004 result from the groundwater sample collected from CRA-RA-30 was 4 ug/l. Therefore, there was an overall increase in the concentration of vinyl chloride at CRA-RA-30.

At CRA-RA-24, vinyl chloride concentrations have fluctuated between 1 ug/l and non-detect (method detection limit = 1 ug/l) in 2004. The most recent result, from August 2004, was 1 ug/l.

No COCs were detected in groundwater sample collected from the Rasmussen water supply well. This was consistent with previous results.

Vinyl chloride was present in groundwater samples collected from CRA-RA-30, located approximately 75 feet upgradient of the Rasmussen water supply well. The samples collected from the Rasmussen water supply well indicated that no COCs were present in the water supply. Therefore, while it was appropriate to continue ozone sparging at SW-2 through SW-5, additional measures would be needed.

As described in the June 7, 2004 letter to U.S. EPA, borehole VAS-26 was installed. Data collected at VAS-26 was used to delineate the northern limit of the vinyl chloride plume in the vicinity of CRA-RA-30. A new monitoring well CRA-RA-32 was installed at the location of VAS-26.

Despite the fact that no COCs have been detected in the Rasmussen water supply well, given its proximity to the plume and the fact it is used as a source of drinking water, as a conservative measure, the PRPs recommend that the Rasmussen water supply well be replaced. The new well should be completed at a location further from the plume. The existing Rasmussen water supply well is completed in the Upper Aquifer. As an added precaution the replacement well will be drilled through the confining layer underneath the Upper Aquifer and completed in the Lower Aquifer.

Monthly sampling of the Rasmussen water supply well should continue until the new water supply well is installed. Water supply well construction began in the summer of 2004 and was completed by July 2004.

#### Additional Investigations (October 29, 2004) Southern Plume

While TCE concentrations declined significantly, they were still between 300 and 400 ug/l, relative to the Part 201 DWC of 5 ug/l. Vinyl chloride concentrations at CRA-RA-27 increased overall, since sparging began in January 2001. The extent of the vinyl chloride plume has also migrated, as indicated by the presence of vinyl chloride at CRA-RA-6S.

The southern plumes were not identified during the Remedial Investigation or the Remedial Design phases of this project, which were conducted by the State of Michigan and Woodward Clyde, respectively. Work conducted since the re-evaluation of the remedial action for the Site by the RSRG led to installation of a sparging system to address the southern plumes. Because it has been 4 years since the last comprehensive field work investigation on the southern plumes, and the plumes have shown the persistent presence of vinyl chloride, the RSRG recommended updating that data on the southern plumes. In addition, the data indicated that sparge wells SW-17 through SW-21 have reduced TCE concentrations, but have not completely prevented the migration of the vinyl chloride plume.

Also, the RSRG intended to update the current limits of the southern plumes. The work that was completed is as follows:

The locations of existing monitoring wells 81-4, CRA-RA-5 and CRA-RA-7 were not currently included in routine sampling programs and the current boundary of the southern plumes needed to be determined. Groundwater samples were collected from these wells and analyzed for VOCs. The purpose of this sampling was to determine if the southern plumes had migrated to the locations of the wells.

The purpose of installing additional VAS boreholes was to confirm the current extent of the southern plumes and to determine if the plume had migrated into areas beyond the previously delineated plume limits. It was determined, below, that the plume had not expanded.

#### Additional Investigations (October 29, 2004) Southern Plume

On July 1, 2004, CRA collected groundwater samples from three existing monitoring wells (CRA-RA-5, CRA-RA-7 and 81-4) located on the Site and the adjacent Spiegelberg property. These wells were not routinely sampled as part of the ongoing groundwater remedy. The samples were collected to determine if the plumes emanating from the western side of the former landfill had expanded since groundwater investigations were completed in this area in 2000. No compounds of concern (COCs) were detected in the groundwater sample collected from CRA-RA-7, which is consistent with historic results. At CRA-RA-5, 18 ug/l of 1,1,1-trichloroethane (1,1,1-TCA) was detected in the groundwater sample. This was consistent with historic results, which were typically less than 100 ug/l for 1,1,1-TCA and significantly lower than the Part 201 Drinking Water Criterion (DWC) of 200 ug/l for 1,1,1-TCA. Vinyl chloride was detected at a

concentration of 2 ug/l in the groundwater sample collected from monitoring well 81-4 on July 1, 2004. This was equal to the Part 201 DWC. Well 81-4 was re-sampled on July 26, 2004 and vinyl chloride was again detected at a concentration of 2 ug/l.

VAS boreholes VAS-27 through VAS-30 were installed during the week of August 9, 2004. At VAS-27 and VAS-28, located west of the TCE plume centered around existing monitoring well CRA-RA-26S, no compounds of concern (COCs) were detected at or above Part 201 DWC. The only compound detected at VAS-27 and VAS-28 was toluene, and it was present at concentrations of 1 ug/l to 2 ug/l, compared to a Part 201 DWC of 790 ug/l.

At VAS-30, located west of the vinyl chloride plume centered on existing monitoring well CRA-RA-27; no COCs were detected.

VAS-29 was located approximately 40 feet northwest of monitoring well 81-4. Vinyl chloride was detected throughout the entire aquifer thickness at VAS-29, at concentrations that ranged from 2 ug/l to 3 ug/l. Toluene (6 ug/l) and benzene (1 ug/l) were also detected in the duplicate groundwater sample collected immediately below the water table.

These results confirmed that the southern TCE and vinyl chloride plume limits had not expanded west to the locations of existing monitoring wells CRA-RA-5 and CRA-RA-7 or VAS boreholes VAS-27, VAS-19 and VAS-30. In order to monitor the western limit of the southern plumes, CRA-RA-7 was added to the quarterly Groundwater Remediation Monitoring Program. Monitoring well (CRA-RA-31) was installed at the location of VAS-30 and added to the quarterly groundwater Remediation Monitoring Program.

The results from existing well 81-4 and VAS-29 confirmed that the vinyl chloride plume extended north to these locations. Groundwater samples from VAS-29 had concentrations of vinyl chloride that ranged from 2 ug/l to 3 ug/l throughout the entire thickness of the aquifer. These concentrations were similar to the 2 ug/l of vinyl chloride present in the samples collected from existing monitoring well 81-4. Therefore, given that 81-4 was located 40 feet south of VAS-29, it was not necessary to install a new monitoring well at VAS-29. Monitoring well 81-4 was included in the quarterly Groundwater Remediation Monitoring Program.

On-going evaluation of the sparging system, groundwater plumes, and monitoring locations utilized or required for quarterly monitoring may result in modifications to these systems. For example, the above referenced results from VAS-29 and 81-4, along with additional quarterly monitoring data, may necessitate additional off-site investigation downgradient from 81-4.

## Site O&M

### Landfill O&M

A breach was found in the northern slope of the outer landfill during the winter of 2000. This breach in the northern slope of the outer landfill was scheduled to be repaired later in the following spring due to the winter conditions. A temporary spillway was installed to convey runoff and precipitation past the breach to the holding pond to prevent any further erosion in the area. Poor weather conditions continued in the Spring 2001 and the cap erosion repairs and the permanent spillway were completed during the week of August 27, 2001. Some minor erosion repairs to the south side of the landfill cap were also completed at this time.

MDEQ observed, during the site visit, small areas of settling of the landfill cap around a few wells and cattails appeared to be growing in those settled areas. These areas will be evaluated and corrective actions will be completed, if necessary.

### Ozone Sparge System O&M

The northern, central and southern zones of the ozone sparge system were operated continuously except when there was a system failure. CRA oversaw operations at this Site and procured contractors to repair the ozone sparge system when there had been a mechanical or electrical failure. Items that have needed repair include:

- ozone leak from the ozone generator which required gasket replacement and some stainless steel gas fittings tightened;
- a bad starter in the compressor which required a new part;
- replacement of an electrode bundle;
- malfunction of a pressure regulator within the oxygen unit which was replaced;
- ozone leak from a crack in the piping for sparge well #9 which was repaired;
- ozone leaks were discovered at some of the sparge well vaults. The leaks were from broken piping within the vaults at the horizontal to vertical transition. It is suspected that settling and freeze-thaw cycles were responsible for the broken pipes. After inspection of all sparge well vaults, repairs were made to the piping of the damaged vaults. A section of pipe was removed at the break and a section of flexible PVC hose was installed to relieve any tension that may result from seasonal temperature fluctuations;
- electrode seals within the ozone generator failed and began to leak which required a total cleaning and rebuild of the ozone generator;
- the system was shut down due to a severe thunderstorm that had also damaged the phone line to the site. As a result, the auto-dialer could not call out to the site operator and the condition was only discovered during the weekly site visit. The system was restarted and the auto-dialer was repaired;
- the internal cooling fan for the Site compressor malfunctioned and the compressor temperature switch shut the system down to prevent damage to the unit which required replacing the burned out motor for the internal cooling fan;

- solenoid valve within the system distribution panel failed in the southern zone treatment system and was rebuilt;
- fusion welds on six of the ozone sparge lines failed due to stress from soil movement caused by seasonal temperature fluctuations and were repaired using a flexible connection;
- the site compressor failed when the internal drive belt broke which was replaced;
- the site oxygen generator failed due to a faulty pressure regulator which was replaced;
- the site air compressor failed when the bolt holding the sheave in place on the air-end drive shaft became loose. This caused the sheave to wobble on the spinning shaft resulting in the destruction of the air-end drive shaft and main seal. This required replacement of the air-end drive shaft;
- an electrode bundle within the ozone generator failed and began to arc and leak ozone which required the tear down and rebuild of all three electrode bundles;
- an ozone leak was discovered in the northern sparge zone of the site from a broken underground sparge pipe which was repaired; and
- a severe thunderstorm damaged the main electrical board in the oxygen generator, which was repaired.

## **VI. Five-Year Review Process**

### **Administrative Components**

The Five-Year Review was based, in part, on Site visits conducted from December 2000 to November 2004; during oversight of the monitoring events, and the analysis of the data contained in the monitoring reports.

The MDEQ, along with the PRPs, were contacted to perform the June 27, 2005 Site Visit with U.S. EPA Region 5. The Site files were reviewed during the Five-Year Review at this Site.

The U.S. EPA Region 5 Office of Regional Counsel assisted in the Five-Year Review and the request for the PRPs to perform an Institutional Control Study at Rasmussen.

The Site was transferred from Ken Glatz, RPM to Howard Caine during April 2005 upon Mr. Glatz's retirement.

### **Community Notification and Involvement**

Initially, public interest in the Rasmussen site was high. A Citizens ACTION Committee was formed by concerned homeowners, and met with MDNR and U.S. EPA personnel on a regular basis through the RI/FS activities. In addition, periodic Newsletters were mailed to over 200 local residents, officials, and other interested parties with information on the status of activities and findings during the RI. However public interest has been low since the OUI paint sludge source removal was completed.

The public was notified of this Five-Year Review on June 17, 2005. The notification was placed in the 'The Livingston Community News' newspaper. No written comments have been received by U.S. EPA Region 5 in conjunction with this notification.

The community was interviewed as part of the Five-Year Review Site Inspection which is included in 'Interviews', below.

### **Document Review**

The RPM reviewed documents, including the ROD, ESD, Amended ROD, and data evaluation of the post monitoring events. The documents reviewed are included in Attachment 6. U.S. EPA completed this Five-Year Review based upon the information obtained from these sources and activities. The MDEQ reviewed the draft Five-Year Review and provided comments to the draft which are included in Attachment 4.

### **Data Review**

The data was reviewed from 'Quarterly Progress Reports, Groundwater and Landfill Remedial Design/Remedial Action' beginning with the April 10, 2000 report. The following bullets highlight the trends in the Rasmussen groundwater plumes:

- The groundwater monitoring well data indicates that the contaminants are generally stable in the Northern Plume;
- The groundwater monitoring well data indicates that PDSLD Area Plume has met the Michigan Part 201 standards;
- The groundwater monitoring well data indicates that the contaminants are both stable and decreasing in the Southern TCE Plume;
- The groundwater monitoring well data indicates that the Southern Vinyl Chloride Plume is generally stable. Monitoring well, CRA-RA-27, however, has no observable trend and monitoring well 81-4 had a recent concentration of 3 ug/l (duplicate sample). Modifications to the monitoring and sparging networks may be necessary throughout the long-term monitoring based on future observations of this plume; and
- The groundwater monitoring well data indicates the Lower Aquifer Plume has met the Michigan Part 201 standards.

The data is summarized in Attachment 2.

### **Site Inspection**

An official Site inspection was conducted on November 9, 2004 hosted by the PRP's contractor. The process equipment, monitoring wells and fencing were all intact. Some minor repairs to the fence were being planned by the PRPs. A follow-up inspection was conducted on June 27, 2005 by the new RPM. The report is included in Attachment 3.

## **Interviews**

The public was interviewed during the Five-Year Review inspection on June 27, 2005. Their concerns were about trucks driving too fast down the road; noise; and property values because of the dump. Rasmussen also has a Salvage Yard business next to the dump and this is where the trucks and noise are involved. The interviews are included in the Site Inspection report in Attachment 3.

## **VII. Technical Assessment**

### **Question A: Is the remedy functioning as intended by the decision documents?**

A review of the relevant documents and the results of the site inspection indicate that the remedy is functioning as intended by the ROD, ESD and ROD Amendment. The remedy has progressed and many of the original components described in the ROD have been completed or discontinued and replaced with an alternate remedial action. These major components include: source area excavation (drum removal and soil removal) and ground water collection and treatment on-site with discharge of treated groundwater through a seepage basin to flush area soil monitoring ground water. As a result of discontinuing certain remedial items, the overall protectiveness of human health and the environment have remained a priority at the Site since the start-up of the ozone sparging system (the replacement remedy for this site). Residential well sampling continues to ensure that drinking water is not impacted. This well is also going to be replaced and moved further away from the plume as a precaution.

The ICs (Deed Restrictions), as required by the ROD, are in place and must remain in place after construction of the remedy has been completed to prevent future intrusive land uses. No activities were observed that would have violated the existing institutional controls. The cap and the surrounding area were undisturbed, and no new uses of groundwater were observed at the Site.

On July 11, 2005, the PRPs sent U.S. EPA a written notice of intent to comply with the Agency's request that the PRPs conduct an IC Study to ensure that the ICs that are in-place are adequate to prevent exposure to contaminants which is included in Attachment 5. Once the PRPs provide the requested IC Study, U.S. EPA will evaluate whether the existing ICs are appropriate and protective of human health, welfare and the environment, and are consistent with the selected remedy.

### **Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?**

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considered (TBC)

There have been no changes in the Applicable or Relevant and Appropriate Requirements (ARARs) and TBCs.

#### Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

There have been no changes in the remaining exposure assumptions that were used in the risk assessment that would affect the protectiveness of the remedy. U.S. EPA considers the assumptions in the risk assessment to be conservative and reasonable in evaluating risk-based cleanup levels. No change to these assumptions or to the cleanup levels developed from them is warranted. There has been no change in the standardized risk assessment methodology that would affect the protectiveness of the remedy. Because the remedy implemented engineering and institutional controls to prevent contact with contaminants that remain at the Site, changes in contaminant toxicity would not impact the effectiveness of the remedy.

#### **Question C: Has any other information come to light that could call into question the protectiveness of the remedy?**

Analytical results from the groundwater monitoring have not indicated there should be a concern regarding the protectiveness of the remedy. No weather-related events have affected the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

#### **Technical Assessment Summary**

According to the data reviewed, the site inspection (SI), and the interviews, the remedy is functioning as intended by the ROD and ROD Amendment. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

#### **VIII. Issues**

The Site needs to have an Institutional Controls Study to ensure that the ICs that are in place are protective of human health and the environment. As mentioned above, on July 11, 2005, the PRPs have agreed to comply with U.S. EPA's request that they conduct an IC Study. See Attachment 5 for the PRP's notice of intent to comply. It is anticipated that the Institutional Controls Study by the PRPs will be completed by November 1, 2005. Once the Institutional Controls Study has been completed, EPA will be able to assess the overall protectiveness of the remedy for the Rasmussen Site.

## **IX. Recommendations and Follow-Up Actions**

Continuing the quarterly groundwater monitoring program is necessary to evaluate the remedy on an ongoing basis. The monitoring network and sparging system will be modified as necessary to address any changes in the groundwater contaminant plumes.

**Table 5**

Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
ICs	An IC Study needs to be performed at the Site to ensure that ICs are protective of human health and the environment	PRPs	U.S. EPA	<b>February 28, 2005</b>	N	Y

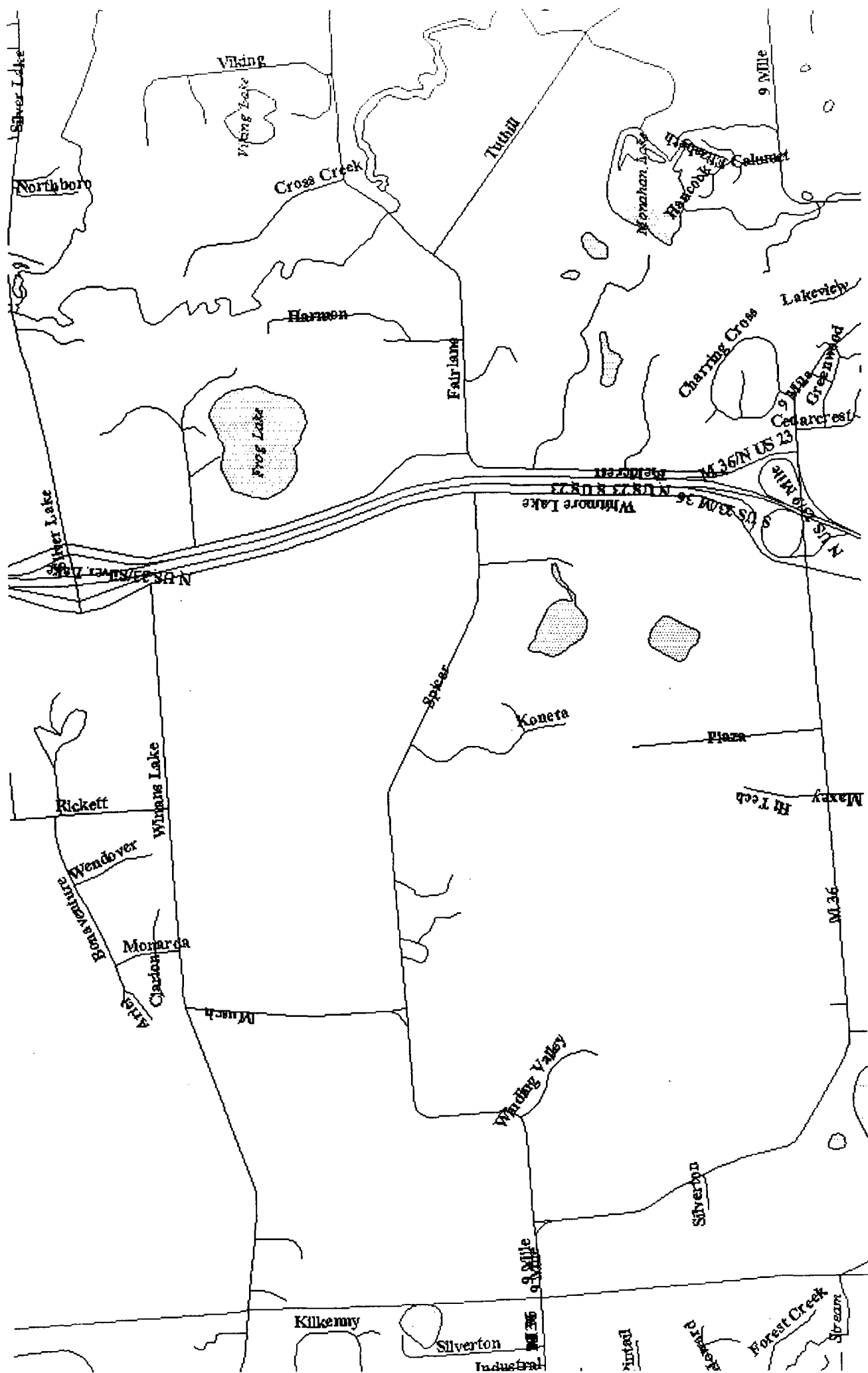
## **X. Protectiveness Statement(s)**

The remedy at Rasmussen Dump currently protects human health and the environment because the source of contamination has been contained, the dump has been capped, the contaminated groundwater remains on-site and the ozone sparging system appears to be reducing the contaminants of concern. However, in order for the remedy to be protective in the long-term, an institutional control study has to be performed; quarterly groundwater monitoring should be continued; and annual residential sampling should be continued to ensure long-term protectiveness.

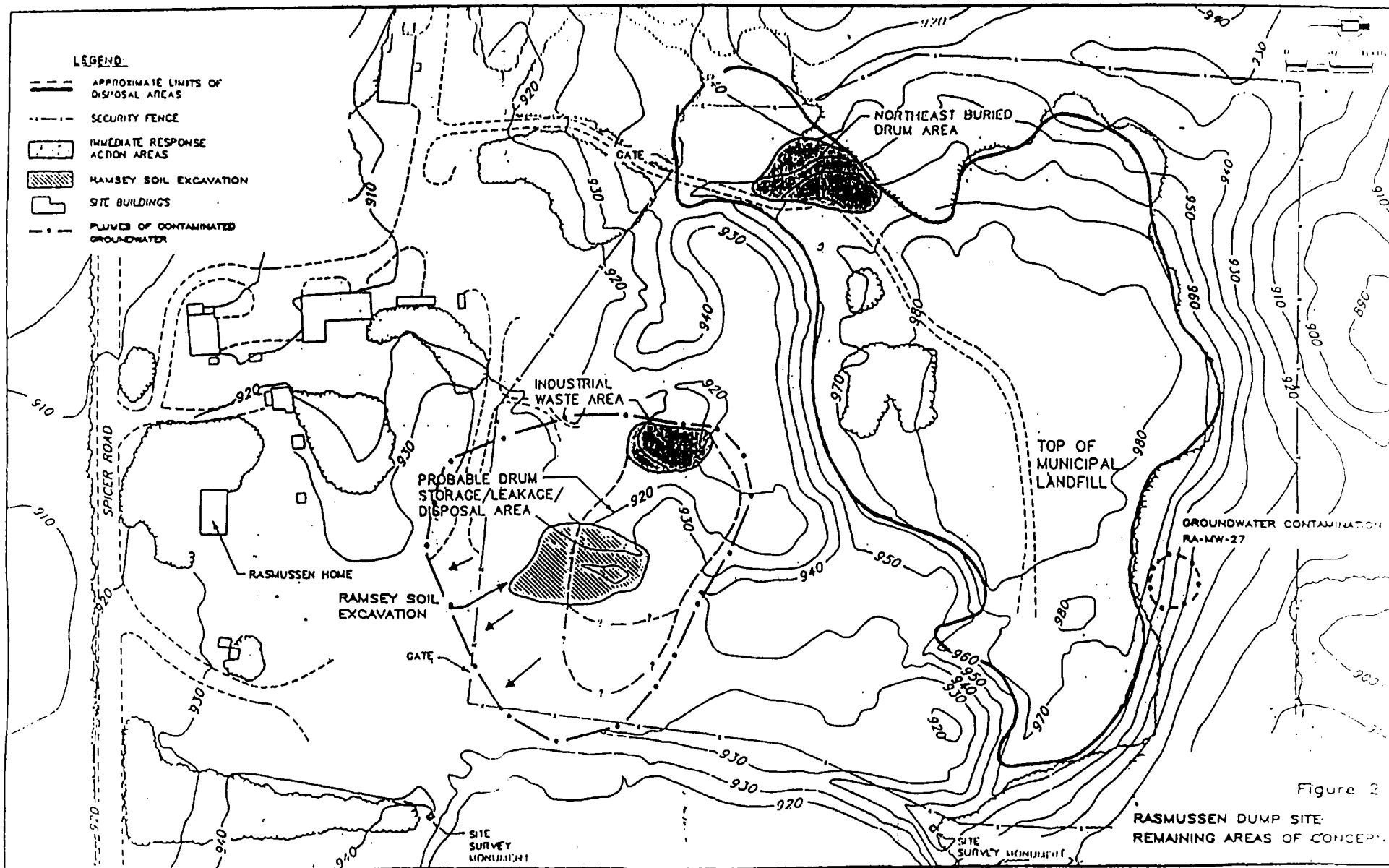
## **XI. Next Review**

The next Five-Year Review for the Rasmussen Dump site is required five years from the date of this review.

## Attachment 1







# Rasmussen's Dump Superfund Site

## 1) State



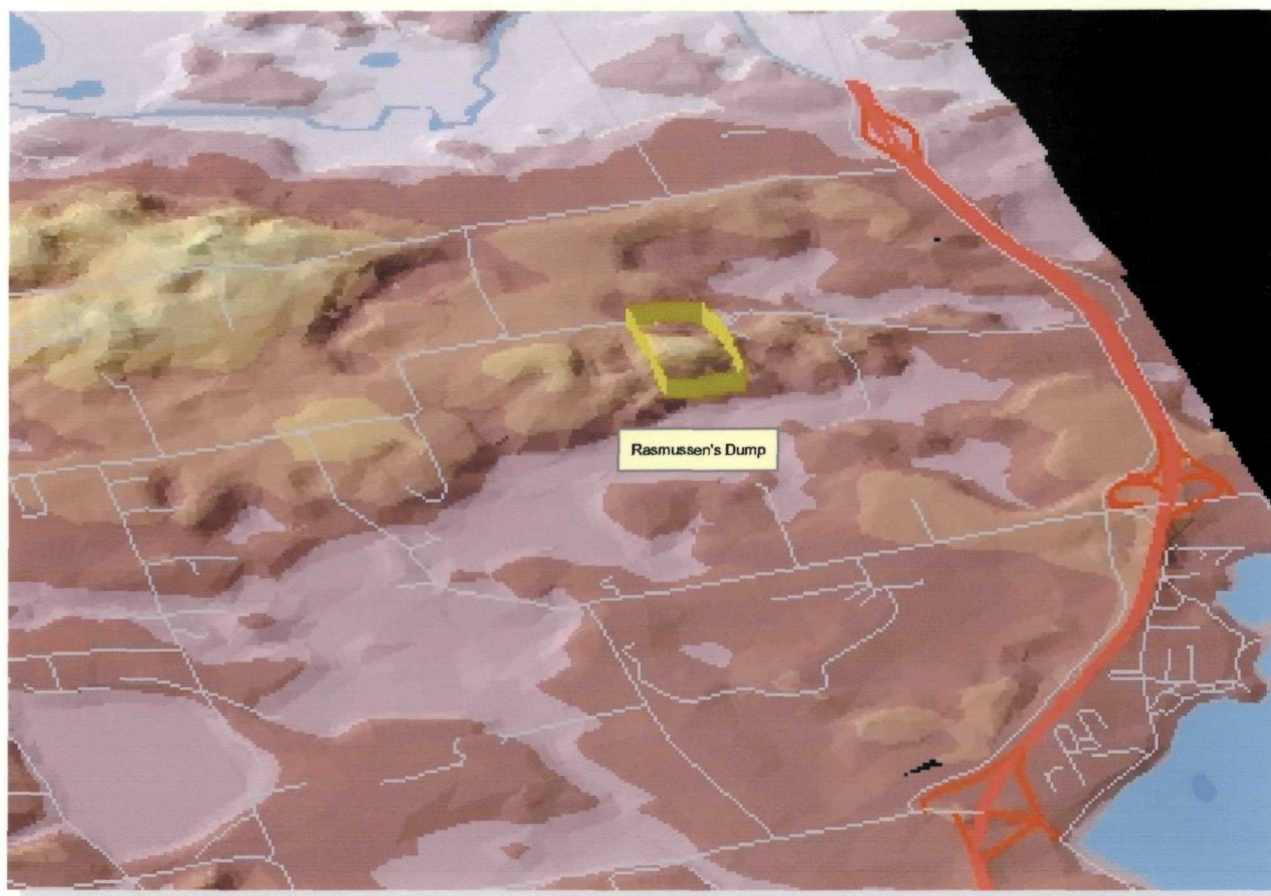
## 2) Livingston County



## 3) Rasmussen's Dump

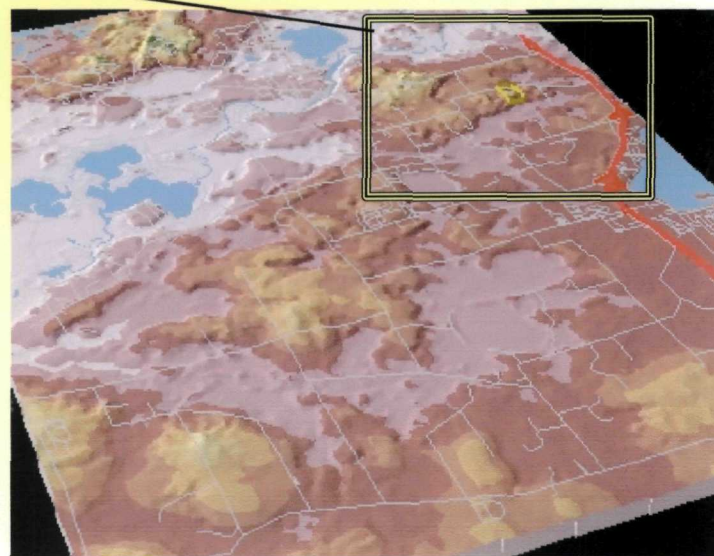


# Rasmussen's Dump Superfund Site 3D Surface Terrain Model



## Elevation Feet

1039 - 1063
1016 - 1039
992 - 1016
968 - 992
945 - 968
921 - 945
897 - 921
874 - 897
850 - 874



## Attachment 2

# **Northern Plume Monitoring Wells with Groundwater Monitoring Results**

Monitoring Wells: CRA-RA-22, CRA-RA-24, CRA-RA-25, 81-8, TEMP-PZ-2, CRA-RA-28, CRA-RA-29, CRA-RA-30, CRA-RA-32

Monitoring Well	Contaminant	GW Standard	11/20/01	12/20/01	12/20/01 Dup.	3/7/02	6/12/02
CRA-RA-22	Vinyl Chloride	2 ppb	7	2	2	6	5
			9/5/02	11/5/02	4/10/03	5/22/03	9/10/03
			6	7	3	4	4
			12/3/03	2/26/04	5/12/04	5/12/04 Dup.	9/16/04
			4	2	3	2	3
			12/15/04	3/17/05	6/8/05		
			2	4	7		
CRA-RA-24	Vinyl Chloride	2 ppb	7/27/99	11/30/00	2/20/01	2/20/01 Dup.	5/30/01
			25/26	N/D	18	18	15
			8/27/01	11/19/01	11/19/01 Dup.	3/7/02	6/12/02
			N/D	9	6	9	9
			9/5/02	11/05/02	4/11/03	4/11/03 Dup.	5/22/03
			6	5	1	1	1
			9/9/03	12/2/03	2/19/04	5/12/04	6/24/04
			N/D	1	N/D	1	N/D
			7/22/04	8/31/04	11/30/04	3/17/05	6/6/05
			1	1	N/D	N/D	N/D
CRA-RA-25	Benzene	5 ppb	7/27/99	11/29/00	2/20/01	5/30/01	8/27/01
			26	8	6	3	2
			All remaining data met applicable groundwater standards				

**Northern Plume Monitoring Wells with Groundwater Monitoring Results (continued)**

<b>Monitoring Well</b>	<b>Contaminant</b>	<b>GW Standard</b>	<b>11/19/01</b>	<b>12/20/01</b>	<b>11/5/02</b>	<b>4/11/03</b>	<b>5/22/03</b>
81-8	Vinyl Chloride	2 ppb	4	2	4	1	N/D
			All remaining data met applicable groundwater standards				
TEMP-PZ-2			All data has met applicable groundwater standards				
CRA-RA-28	Vinyl Chloride	2 ppb	<b>2/12/03</b>	<b>4/10/03</b>	<b>5/22/03</b>	<b>9/9/03</b>	<b>12/2/03</b>
			20	3	10	11	11
			<b>2/19/04</b>	<b>5/11/04</b>	<b>9/1/04</b>	<b>12/15/04</b>	<b>3/17/05</b>
			8	12	12	9	9
			<b>6/2/05</b>				
			10				
CRA-RA-29			All data has met applicable groundwater standards				
CRA-RA-30	Vinyl Chloride	2 ppb	<b>5/12/04</b>	<b>6/24/04</b>	<b>7/22/04</b>	<b>7/22/04 Dup.</b>	<b>8/31/04</b>
			3	2	2	1	4
			<b>11/30/04</b>	<b>11/30/04 Dup.</b>	<b>3/17/05</b>	<b>6/8/05</b>	
			3	3	3	3	
CRA-RA-32			All data has met applicable groundwater standards				
PZ-104*	Vinyl Chloride	2 ppb	<b>2/8/01</b>	<b>11/21/01</b>	<b>4/18/02</b>	<b>4/18/02 Dup.</b>	<b>6/12/02</b>
			7	5	7	7	N/D
			<b>6/12/02 Dup.</b>	<b>8/29/02</b>	<b>11/5/02</b>	<b>4/10/03</b>	<b>5/22/03</b>
			4	4	3	1	2
			<b>9/9/03</b>	All remaining data met applicable groundwater standards			
			N/D				

\*EW-104 corresponds with PZ-104 and had results of vinyl chloride 9 ppb [2 ppb limit] and 1,2-dichloroethene 6 ppb [5 ppb limit] on 11/11/99

**PDSLD Area Plume Monitoring Wells with Groundwater Monitoring Results**

Monitoring Wells: CRA-RA-2D, CRA-RA-3, CRA, RA-MW-18D, RA-MW-22, RA-MW-28, PZ-106

Monitoring Well	Contaminant	GW Standard	2/22/00	2/22/00 Dup.	11/28/00	2/20/01	5/30/01
CRA-RA-2D	Vinyl Chloride	2 ppb	N/D	1	2	2	3
			8/28/01	11/21/01	3/6/02	5/22/02	8/29/02
			N/D	4	N/D	4	2
			11/7/02	4/3/03	All remaining data met applicable groundwater standard		
			2	N/D			
CRA-RA-3			All data has met applicable groundwater standards				
RA-MW-18D			All data has met applicable groundwater standards				
RA-MW-22			All data has met applicable groundwater standards				
RA-MW-28			All data has met applicable groundwater standards				
PZ-106**			All data has met applicable groundwater standards				
EB-PZ-4***			All data has met applicable groundwater standards				

\*\*EW-106 corresponds with PZ-106 and had results of chlorobenzene, 120 ppb [100 ppb limit]; ethylbenzene 110 ppb [74 ppb limit]; and xylenes (total) 357 ppb [280 ppb limit] on 12/15/99

\*\*\*EW-101 corresponds with EB-PZ-4 and had results of chlorobenzene 190 ppb [100 ppb limit]; benzene 8 [5.0 std]; ethylbenzene 96 ppb [74 ppb limit]; and vinyl chloride 3 ppb [2.0 ppb limit] on 11/11/99

# Southern TCE Area Plume Monitoring Wells with Groundwater Monitoring Results

Monitoring Wells: CRA-RA-8, CRA-RA-23D, CRA-RA-26D, CRA-RA-26S

Monitoring Well	Contaminant	GW Standard					
CRA-RA-8			All data has met applicable groundwater standards				
CRA-RA-23D			All data has met applicable groundwater standards				
CRA-RA-26D	TCE	5 ppb	5/15/00	6/1/00	All remaining data met applicable groundwater standard		
			8	8			
CRA-RA-26S	TCE	5 ppb	5/15/00	6/1/00	2/21/01	6/5/01	8/23/01
			640	690	560	700	660
			8/23/01 Dup.	11/20/01	3/5/02	3/5/02 Dup.	5/22/02
			770	610	490	480	670
			5/22/02 Dup.	8/28/02	11/19/02	4/3/03	4/3/03 Dup.
			660	540	380	360	350J
			5/28/03	9/15/03	12/11/03	3/2/04	6/1/04
			350	390	380	370	400
			9/20/04	9/20/04 Dup.	12/20/04	3/10/05	6/8/05
			360	360	320	310	300

# Southern Vinyl Chloride Area Plume Monitoring Wells with Groundwater Monitoring Results

Monitoring Wells: CRA-RA-27, CRA-RA-6S, CRA-RA-18, CRA-RA-5, 81-4, CRA-RA-7, CRA-RA-5, CRA-RA-31

Monitoring Well	Contaminant	GW Standard	12/20/00	12/20/00 Dup.	3/1/01	3/1/01 Dup.	5/6/01
CRA-RA-27	Vinyl Chloride	2 ppb	20	19	18	18	30
			5/6/01 Dup.	8/23/01	11/20/01	12/20/01	3/6/02
			30	31	49	33	39
			5/22/02	8/28/02	11/18/02	4/3/03	5/28/03
			39	59	88	49	64
			9/15/03	9/15/03 Dup.	12/11/03	3/2/04	3/2/04 Dup.
			31	32	50	46	45
			6/1/04	9/20/04	12/20/04	3/10/05	3/10/05 Dup.
			40	30	40	63	68
			6/8/05				
			58				
CRA-RA-6S	Vinyl Chloride	2 ppb	11/20/01	12/20/01	3/6/02	5/22/02	8/29/02
			6	7	10	7	7
There was a one-time benzene reading above the standard of 5 ppb. It was 6 ppb on 12/20/03.			11/19/02	4/3/03	5/29/03	9/11/03	12/20/03
			14	9	9	7	8
			3/2/04	6/1/04	9/20/04	12/29/04	3/22/05
			4	4	3	5	5
			6/8/05				
			4				
CRA-RA-18			All data has met applicable groundwater standards				
CRA-RA-5			All data has met applicable groundwater standards				
81-4			All data has met applicable groundwater standards; except for 6/9/05: 2 ug/l and 3 ug/l (duplicate)				
CRA-RA-7			All data has met applicable groundwater standards				
CRA-RA-5			All data has met applicable groundwater standards				
CRA-RA-31			All data has met applicable groundwater standards				

### Landfill Monitoring Program

Monitoring Wells CRA-RA-8, CRA-RA-18, CRA-RA-19S, CRA-RA-20, CRA-RA-6S

Monitoring Well	Contaminant	GW Standard					
CRA-RA-8			All data has met applicable groundwater standards				
CRA-RA-18			All data has met applicable groundwater standards				
CRA-RA-19S			All data has met applicable groundwater standards				
CRA-RA-20			All data has met applicable groundwater standards				
CRA-RA-6S	Vinyl Chloride	2 ppb	<b>11/20/01</b>	<b>12/20/01</b>	<b>3/6/02</b>	<b>5/22/02</b>	<b>8/29/02</b>
			6	7	10	7	7
There was a one-time benzene reading above the standard of 5 ppb. It was 6 ppb on 12/20/03.			<b>11/19/02</b>	<b>4/3/03</b>	<b>5/29/03</b>	<b>9/11/03</b>	<b>12/20/03</b>
			14	9	9	7	8
			<b>3/2/04</b>	<b>6/1/04</b>	<b>9/20/04</b>	<b>12/29/04</b>	<b>3/22/05</b>
			4	4	3	5	5

### Lower Aquifer Plume

Groundwater Well RA-MW-47 (All data has met applicable groundwater standards)

### Attachment 3

**United States Environmental Protection Agency  
Region 5  
77 West Jackson Boulevard  
Chicago, Illinois 60604**

**Date:** July 22, 2005

**Site Visit:** Rasmussen Dump, Spicer Road, Brighton (Green Oak Township),  
Michigan 48116

**From:** Howard Caine, RPM *HC*

**To:** File

**Introduction and Purpose**

The United States Environmental Protection Agency (U.S. EPA) Region 5 conducted a Site Visit as part of the Five-Year Review at Ramussen Dump. The Site was toured, paperwork was reviewed and homeowners in the area of the Site were interviewed. The Site Visit took place on June 27, 2005.

**Participants**

Howard Caine, U.S. EPA

Keith Krawczyk, Michigan Department of Environmental Quality (MDEQ)

J.R. "Bart" Bartholomy, Conestoga-Rovers & Associates (CRA)

Steve Rapai, CRA

**Inspection**

**On-Site Documents & Records Verified**

The O&M Documents, Site Specific Health and Safety Plan, and O&M and OSHA Training Records were available on-site. Groundwater monitoring records are mailed to U.S. EPA and MDEQ on a quarterly basis.

**O&M Costs**

The O&M is performed for the PRP by CRA. O&M cost records were not available on-site, but Mr. Bartholomy estimated that the annual operating costs are approximately \$100,000. Mr. Bartholomy stated that the Site appeared to be operating normally and that there were no unanticipated or unusually high O&M costs.

### **Access and Institutional Controls**

Fencing around the Site appeared to be adequate and intact. There was minor damage to the barbed wire in one section of the fence. Mr. Bartholomy said that this would be repaired. It was caused by tree damage. CRA also plans on doing tree trimming around the fence in 2006 to prevent any other damage to the barbed wire or fence. Signs were also placed on the fence around the Site. The fence to the Site is locked.

U.S. EPA has requested that the PRPs perform an Institutional Control (IC) Study at the Site and they have agreed to perform it. The purpose of this study is to ensure that the ICs in place are adequate to protect human health and the environment.

There was no evidence of vandalism or trespassing; land use changes on-site; and land use changes off-site.

### **General Site Conditions**

The roads appeared to be maintained. The Site appeared to be in adequate shape.

### **Landfill Covers**

#### *Landfill Surface*

There was no evidence of settlement, cracking, erosion, holes, bulges, water damage or slope instability in the landfill cover. The landfill cover is comprised of grass.

#### *Benches*

The landfill does not have benches.

#### *Letdown Channels*

The letdown channel had no evidence of settlement, degradation, erosion, undercutting, obstructions or excessive growth.

#### *Cover Penetrations*

##### *Gas Vents*

The Site has passive gas vents. The gas vents were sampled initially, but after review of the low emissions from the vents, the gas vents were no longer required to be sampled. The samples were collected with Summa canisters and according to Mr. Bartholomy, the emissions were 'next to nothing'. A few of the gas vents need to have the screens re-taped to the end of the vents.

##### *Monitoring Wells*

The monitoring wells that were observed were properly locked and secured, are routinely sampled and were in good condition.

#### *Gas Collection and Treatment*

This Site does not have a gas collection and treatment system.

#### *Cover Drainage Layer*

The cover drainage layer has functioning outlet rock. The outlet rock is inspected.

#### *Detention/Sedimentation Ponds*

There was no evidence of siltation or erosion.

#### *Retaining Walls*

This Site does not have retaining walls.

#### *Perimeter Ditches/Off-Site Discharge*

This Site does not have perimeter ditches or off-site discharge

### **Vertical Barrier Walls**

This Site does not have vertical barrier walls.

### **Groundwater/Surface Water Remedies**

The pump and treat system was shutdown in early 2000.

The groundwater is being treated with an Ozone/Oxygen Sparging System. The ozone/oxygen sparging system consists of an air compressor, oxygen concentrator, ozone generator (ozone generated by super high voltage), a distribution panel and more distribution valves in front of the treatment plant. The system is in good condition. The sampling ports are properly marked and functional and the equipment was properly identified. The electrical enclosures and panels appeared to be in good condition. The treatment building also appeared to be in good condition.

### **Monitoring Data**

The monitoring data is routinely submitted on-time and is of acceptable quality. The groundwater suggests that the groundwater plume is effectively contained and that the contaminants, in general, are declining.

### **Attachments**

- Five-Year Review Site Inspection Checklist
- Interview Documentation Form
- Interview Records
- Site Location Map
- Site Aerial Photo
- Site Aerial Map
- Public Notice for Five-Year Review



Photo 1: Treatment Plant Building



Photo 2: Top of Landfill

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

### Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: <u>RIMMUSEN DUMP</u>	Date of inspection: <u>6/27/05</u>
Location and Region: <u>BRIGHTON, MI / RS</u>	EPA ID: <u>MD 095 402 210</u>
Agency, office, or company leading the five-year review: <u>US EPA</u>	Weather/temperature: <u>140 F 95 %</u>
Remedy Includes: (Check all that apply) Landfill cover/containment <input checked="" type="checkbox"/> Monitored natural attenuation Access controls <input checked="" type="checkbox"/> Groundwater containment Institutional controls <input checked="" type="checkbox"/> Vertical barrier walls Groundwater pump and treatment <u>[MOTH BILLED] AKA STAND-BY</u> Surface water collection and treatment Other <u>OZONE SPARGING</u>	
Attachments: Inspection team roster attached <input checked="" type="checkbox"/> Site map attached <input checked="" type="checkbox"/>	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager <u>BART BARTOLIC</u> <u>PROJECT MGR</u> <u>6/27/05</u> Name Title Date Interviewed <u>(at site)</u> at office by phone Phone no. <u>269 344 1230</u> Problems, suggestions; Report attached _____	
2. O&M staff <u>STEVE RABAI</u> <u>O&amp;M TECHNICIAN</u> <u>6/27/05</u> Name Title Date Interviewed <u>(at site)</u> at office by phone Phone no. <u>269 344 1230</u> Problems, suggestions; Report attached _____	

MAILING ADDRESS: BRIGHTON, MI  
 ACTUAL ADDRESS: GREEN OAK, MI  
 D-7



III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	<b>O&amp;M Documents</b> O&M manual As-built drawings Maintenance logs Remarks _____	Readily available Readily available Readily available	Up to date Up to date Up to date	N/A N/A N/A
2.	<b>Site-Specific Health and Safety Plan</b> Contingency plan/emergency response plan Remarks _____	Readily available Readily available	Up to date Up to date	N/A N/A
3.	<b>O&amp;M and OSHA Training Records</b> Remarks _____	Readily available	Up to date	N/A
4.	<b>Permits and Service Agreements</b> Air discharge permit Effluent discharge Waste disposal, POTW Other permits _____ Remarks _____	Readily available Readily available Readily available Readily available	Up to date Up to date Up to date Up to date	N/A N/A N/A N/A
5.	<b>Gas Generation Records</b> Remarks _____	Readily available	Up to date	N/A
6.	<b>Settlement Monument Records</b> Remarks _____	Readily available	Up to date	N/A
7.	<b>Groundwater Monitoring Records</b> Remarks <u>MAILED TO OSHA 10/26/98 QTRLY</u>	Readily available	Up to date	N/A
8.	<b>Leachate Extraction Records</b> Remarks _____	Readily available	Up to date	N/A
9.	<b>Discharge Compliance Records</b> Air Water (effluent) Remarks _____	Readily available Readily available	Up to date Up to date	N/A N/A
10.	<b>Daily Access/Security Logs</b> Remarks <u>ON-SITE WORK</u>	Readily available	Up to date	N/A

IV. O&M COSTS			
1.	<b>O&amp;M Organization</b> State in-house _____ PRP in-house _____ Federal Facility in-house _____ Other _____	Contractor for State _____ <u>Contractor for PRP</u> <i>CRA</i> Contractor for Federal Facility _____	
2.	<b>O&amp;M Cost Records</b> Readily available _____ Up to date _____ Funding mechanism/agreement in place _____ Original O&M cost estimate _____ Breakdown attached _____	<i>PRP LEAD APPROX. \$400/K YR TO O&amp;M</i>	
Total annual cost by year for review period if available			
	From _____ To _____ Date Date	Total cost _____	Breakdown attached _____
	From _____ To _____ Date Date	Total cost _____	Breakdown attached _____
	From _____ To _____ Date Date	Total cost _____	Breakdown attached _____
	From _____ To _____ Date Date	Total cost _____	Breakdown attached _____
	From _____ To _____ Date Date	Total cost _____	Breakdown attached _____
3. <b>Unanticipated or Unusually High O&amp;M Costs During Review Period</b> Describe costs and reasons: <i>SITE RUNNING NORMALLY</i> _____ _____ _____ _____			
V. ACCESS AND INSTRUMENTAL CONTROLS			
<i>Applicable</i> N/A			
<b>A. Fencing</b>			
1.	<b>Fencing damaged</b> Remarks <i>MINOR BARBED WIRE IN ONE SECTION WILL BE REMOVED, WILL BE FIXED</i>	Location shown on site map _____ Gates secured _____	N/A
<b>B. Other Access Restrictions</b>			
1.	<b>Signs and other security measures</b> Remarks <i>OK</i>	Location shown on site map _____	N/A

**C. Institutional Controls (ICs)****1. Implementation and enforcement**

Site conditions imply ICs not properly implemented

Yes

No

N/A

Site conditions imply ICs not being fully enforced

Yes

No

N/A

Type of monitoring (e.g., self-reporting, drive by) \_\_\_\_\_

Frequency \_\_\_\_\_

Responsible party/agency \_\_\_\_\_

Contact \_\_\_\_\_

Name

Title

Date

Phone no.

Reporting is up-to-date

Yes

No

N/A

Reports are verified by the lead agency

Yes

No

N/A

Specific requirements in deed or decision documents have been met

Yes

No

N/A

Violations have been reported

Yes

No

N/A

Other problems or suggestions: Report attached

**2. Adequacy**

ICs are adequate

ICs are inadequate

N/A

Remarks \_\_\_\_\_

**D. General****1. Vandalism/trespassing**

Location shown on site map

No vandalism evident

Remarks \_\_\_\_\_

**2. Land use changes on site**

N/A

Remarks \_\_\_\_\_

**3. Land use changes off site**

N/A

Remarks \_\_\_\_\_

**VI. GENERAL SITE CONDITIONS****A. Roads**

Applicable

N/A

**1. Roads damaged**

Location shown on site map

Roads adequate

N/A

Remarks \_\_\_\_\_

IC STUDY LETTER  
WENT OUT.

<b>B. Other Site Conditions</b>			
Remarks <u>SITE APPEARED TO BE OK</u>			
<b>VII. LANDFILL COVERS</b> <u>Applicable</u> N/A			
<b>A. Landfill Surface</b>			
1.	<b>Settlement (Low spots)</b> Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	<u>Settlement not evident</u>
2.	<b>Cracks</b> Lengths _____ Remarks _____	Location shown on site map _____ Widths _____ Depths _____	<u>Cracking not evident</u>
3.	<b>Erosion</b> Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	<u>Erosion not evident</u>
4.	<b>Holes</b> Areal extent _____ Remarks _____	Location shown on site map _____ Depth _____	<u>Holes not evident</u>
5.	<b>Vegetative Cover</b> Trees/Shrubs (indicate size and locations on a diagram) Remarks _____	<u>Grass</u> Cover properly established	No signs of stress
6.	<b>Alternative Cover (armored rock, concrete, etc.)</b> Remarks _____	<u>N/A</u>	
7.	<b>Bulges</b> Areal extent _____ Remarks _____	Location shown on site map _____ Height _____	<u>Bulges not evident</u>

8.	<b>Wet Areas/Water Damage</b>	<u>Wet areas/water damage not evident</u>	
	Wet areas	Location shown on site map	Areal extent _____
	Ponding	Location shown on site map	Areal extent _____
	Seeps	Location shown on site map	Areal extent _____
	Soft subgrade	Location shown on site map	Areal extent _____
	Remarks _____		
9.	<b>Slope Instability</b>	Slides	Location shown on site map <u>No evidence of slope instability</u>
	Areal extent _____		
	Remarks _____		
<b>B. Benches</b>		Applicable	<u>N/A</u>
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	<b>Flows Bypass Bench</b>	Location shown on site map	N/A or okay
	Remarks _____		
2.	<b>Bench Breached</b>	Location shown on site map	N/A or okay
	Remarks _____		
3.	<b>Bench Overtopped</b>	Location shown on site map	N/A or okay
	Remarks _____		
<b>C. Letdown Channels</b>		Applicable	N/A <u>THERE IS A CHANNEL, BUT NOT BENCH</u>
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)			
1.	<b>Settlement</b>	Location shown on site map	<u>No evidence of settlement</u>
	Areal extent _____	Depth _____	
	Remarks _____		
2.	<b>Material Degradation</b>	Location shown on site map	<u>No evidence of degradation</u>
	Material type _____	Areal extent _____	
	Remarks _____		
3.	<b>Erosion</b>	Location shown on site map	<u>No evidence of erosion</u>
	Areal extent _____	Depth _____	
	Remarks _____		

4.	<b>Undercutting</b>	Location shown on site map	<u>No evidence of undercutting</u>	
	Areal extent _____	Depth _____		
	Remarks _____			
5.	<b>Obstructions</b>	Type _____	<u>No obstructions</u>	
	Location shown on site map	Areal extent _____		
	Size _____			
	Remarks _____			
6.	<b>Excessive Vegetative Growth</b>	Type _____		
	<u>No evidence of excessive growth</u>			
	Vegetation in channels does not obstruct flow			
	Location shown on site map	Areal extent _____		
	Remarks _____			
<b>D. Cover Penetrations</b> Applicable      N/A				
1.	<b>Gas Vents</b>	Active	<u>Passive</u>	
	Properly secured/locked	Functioning	Routinely sampled	<u>Good condition</u>
	Evidence of leakage at penetration		Needs Maintenance	
	N/A			
	Remarks <u>SOME NEED TO RE-TAPE SCREENS TO VENTS</u>			
2.	<b>Gas Monitoring Probes</b>			
	Properly secured/locked	Functioning	Routinely sampled	Good condition
	Evidence of leakage at penetration		Needs Maintenance	<u>N/A</u>
	Remarks _____			
3.	<b>Monitoring Wells (within surface area of landfill)</b>			
	<u>Properly secured/locked</u>	<u>Functioning</u>	<u>Routinely sampled</u>	<u>Good condition</u>
	Evidence of leakage at penetration		Needs Maintenance	N/A
	Remarks _____			
4.	<b>Leachate Extraction Wells</b>			
	Properly secured/locked	Functioning	Routinely sampled	Good condition
	Evidence of leakage at penetration		Needs Maintenance	<u>N/A</u>
	Remarks _____			
5.	<b>Settlement Monuments</b>	Located	Routinely surveyed	<u>N/A</u>
	Remarks _____			

<b>E. Gas Collection and Treatment</b>		Applicable	<u>N/A</u>
1.	<b>Gas Treatment Facilities</b> Flaring Good condition Remarks _____	Thermal destruction Needs Maintenance	Collection for reuse
2.	<b>Gas Collection Wells, Manifolds and Piping</b> Good condition Remarks _____	Needs Maintenance	
3.	<b>Gas Monitoring Facilities</b> (e.g., gas monitoring of adjacent homes or buildings) Good condition Remarks _____	Needs Maintenance	N/A
<b>F. Cover Drainage Layer</b>		<u>Applicable</u>	N/A
1.	<b>Outlet Pipes Inspected</b> Remarks _____	Functioning	<u>N/A</u>
2.	<b>Outlet Rock Inspected</b> Remarks _____	<u>Functioning</u>	N/A
<b>G. Detention/Sedimentation Ponds</b>		<u>Applicable</u>	N/A
1.	<b>Siltation</b> Areal extent _____ Depth _____ <del>Siltation not evident</del> Remarks _____		N/A
2.	<b>Erosion</b> Areal extent _____ Depth _____ <del>Erosion not evident</del> Remarks _____		
3.	<b>Outlet Works</b> Remarks _____	Functioning	<u>N/A</u>
4.	<b>Dam</b> Remarks _____	Functioning	<u>N/A</u>

<b>H. Retaining Walls</b>		Applicable	<u>N/A</u>
1.	<b>Deformations</b> Horizontal displacement _____ Rotational displacement _____ Remarks _____	Location shown on site map	Deformation not evident Vertical displacement _____
2.	<b>Degradation</b> Remarks _____	Location shown on site map	Degradation not evident
<b>I. Perimeter Ditches/Off-Site Discharge</b>		Applicable	<u>N/A</u>
1.	<b>Siltation</b> Areal extent _____ Remarks _____	Location shown on site map	Siltation not evident Depth _____
2.	<b>Vegetative Growth</b> Vegetation does not impede flow Areal extent _____ Remarks _____	Location shown on site map	N/A Type _____
3.	<b>Erosion</b> Areal extent _____ Remarks _____	Location shown on site map	Erosion not evident Depth _____
4.	<b>Discharge Structure</b> Remarks _____	Functioning	N/A
<b>VIII. VERTICAL BARRIER WALLS</b>		Applicable	<u>N/A</u>
1.	<b>Settlement</b> Areal extent _____ Remarks _____	Location shown on site map	Settlement not evident Depth _____
2.	<b>Performance Monitoring</b> Performance not monitored Frequency _____ Head differential _____ Remarks _____	Type of monitoring _____	Evidence of breaching

<b>IX. GROUNDWATER/SURFACE WATER REMEDIES</b>		Applicable	N/A
<b>A. Groundwater Extraction Wells, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Pumps, Wellhead Plumbing, and Electrical</b> Good condition      All required wells properly operating      Needs Maintenance      N/A Remarks _____ _____		
2.	<b>Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition      Needs Maintenance Remarks _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available      Good condition      Requires upgrade      Needs to be provided Remarks _____ _____		
<b>B. Surface Water Collection Structures, Pumps, and Pipelines</b>		Applicable	N/A
1.	<b>Collection Structures, Pumps, and Electrical</b> Good condition      Needs Maintenance Remarks _____ _____		
2.	<b>Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances</b> Good condition      Needs Maintenance Remarks _____ _____		
3.	<b>Spare Parts and Equipment</b> Readily available      Good condition      Requires upgrade      Needs to be provided Remarks _____ _____		

<b>C. Treatment System</b>		<u>Applicable</u>	N/A
1.	<b>Treatment Train</b> (Check components that apply) Metals removal _____ Oil/water separation _____ Bioremediation _____ Air stripping _____ Carbon adsorbers _____ Filters _____ Additive (e.g., chelation agent, flocculent) _____ Others <u>IRON/TOXYGEN SPARKS</u> <u>Good condition</u> _____ Needs Maintenance _____ Sampling ports properly marked and functional <input checked="" type="checkbox"/> Sampling/maintenance log displayed and up to date <input checked="" type="checkbox"/> Equipment properly identified <input checked="" type="checkbox"/> Quantity of groundwater treated annually <u>N/A (SPARKS)</u> Quantity of surface water treated annually _____ Remarks _____		
2.	<b>Electrical Enclosures and Panels</b> (properly rated and functional) N/A _____ <u>Good condition</u> _____ Needs Maintenance _____ Remarks _____		
3.	<b>Tanks, Vaults, Storage Vessels</b> <u>N/A</u> _____ Good condition _____ Proper secondary containment _____ Needs Maintenance _____ Remarks _____		
4.	<b>Discharge Structure and Appurtenances</b> <u>N/A</u> _____ Good condition _____ Needs Maintenance _____ Remarks _____		
5.	<b>Treatment Building(s)</b> N/A _____ <u>Good condition (esp. roof and doorways)</u> _____ Needs repair _____ Chemicals and equipment properly stored <input checked="" type="checkbox"/> Remarks _____		
6.	<b>Monitoring Wells</b> (pump and treatment remedy) <u>Properly secured/locked</u> <u>Functioning</u> <u>Routinely sampled</u> <u>Good condition</u> All required wells located _____ Needs Maintenance _____ N/A _____ Remarks _____		
<b>D. Monitoring Data</b>			
1.	<b>Monitoring Data</b> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality <input checked="" type="checkbox"/>		
2.	<b>Monitoring data suggests:</b> Groundwater plume is effectively contained <input checked="" type="checkbox"/> Contaminant concentrations are declining <input checked="" type="checkbox"/>		

<b>D. Monitored Natural Attenuation</b>			
1.	<b>Monitoring Wells (natural attenuation remedy)</b>		
	Properly secured/locked	Functioning	Routinely sampled
	All required wells located	Needs Maintenance	Good condition
	Remarks		N/A
<b>X. OTHER REMEDIES</b>			
<p>If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.</p>			
<b>XI. OVERALL OBSERVATIONS</b>			
<b>A. Implementation of the Remedy</b>			
<p>Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).</p> <p style="font-family: cursive;">SEE BODY OF REPORT (5-YR REVIEW)</p>			
<b>B. Adequacy of O&amp;M</b>			
<p>Describe issues and observations related to the implementation and scope of O&amp;M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.</p> <p style="font-family: cursive;">SEE BODY OF REPORT (5-YR REVIEW)</p>			

**C. Early Indicators of Potential Remedy Problems**

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

*N/A*

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**D. Opportunities for Optimization**

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

*N/A*

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## INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

<u>BART BARTHOLOMEY*</u>	<u>SITE MANAGER</u>	<u>CRA</u>	<u>6/27/05</u>
Name	Title/Position	Organization	Date
<u>STEVE RAPP*</u>	<u>OSM TECHNICIAN</u>	<u>CRA</u>	<u>6/27/05</u>
Name	Title/Position	Organization	Date
<u>KEITH KRAWCZYK*</u>	<u>PROJECT MGR.</u>	<u>NDEP</u>	<u>6/27/05</u>
Name	Title/Position	Organization	Date
<u>CAROL BEDNARWICZ</u>	<u>HOMEOWNER</u>		<u>6/27/05</u>
Name	Title/Position	Organization	Date
<u>ANGELA TIJANO</u>	<u>HOMEOWNER</u>		<u>6/27/05</u>
Name	Title/Position	Organization	Date
<u>JAMES &amp; EDNA SCHWETZ</u>	<u>HOMEOWNERS</u>		<u>6/27/05</u>
Name	Title/Position	Organization	Date

\*ANY COMMENTS BY THESE INDIVIDUALS MAY BE CONTAINED IN THE TRIP REPORT AND/OR FIVE-YEAR REVIEW REPORT.

## INTERVIEW RECORD

Site Name: <i>RASMUSSEN DUMP</i>		EPA ID No.: <i>MD 095402210</i>	
Subject: <i>5-YR REVIEW</i>		Time: <i>3:55 P</i>	Date: <i>6/27/05</i>
Type: <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit: <i>HOME</i>			
Contact Made By:			
Name: <i>HOWARD CANE</i>	Title: <i>RPM</i>	Organization: <i>US EPA</i>	
Individual Contacted:			
Name: <i>[REDACTED]</i>	Title: <i>HOMEWORK</i>	Organization:	
Telephone No:	Street Address:	<i>[REDACTED]</i>	
Fax No:	City, State, Zip:	<i>[REDACTED]</i>	
E-Mail Address:			

## Summary Of Conversation

*OK W/DUMP*  
*TRUCKS DRIVE TOO FAST DOWN THE*  
*ROAD*

## INTERVIEW RECORD

Site Name: <i>RABMUSSEN DUMP</i>		EPA ID No.: <i>MID 095 402 210</i>	
Subject: <i>5-YR REVIEW</i>		Time: <i>4<sup>00</sup> P</i>	Date: <i>6/27/05</i>
Type: <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Location of Visit: <i>HOME</i>			
Contact Made By:			
Name: <i>HOWARD CATNE</i>	Title: <i>RPM</i>	Organization: <i>US EPA</i>	
Individual Contacted:			
Name: <i>[REDACTED]</i>	Title: <i>HOMEOWNER</i>	Organization:	
Telephone No:	Street Address:	<i>[REDACTED]</i>	
Fax No:	City, State, Zip:	<i>[REDACTED]</i>	
E-Mail Address:			

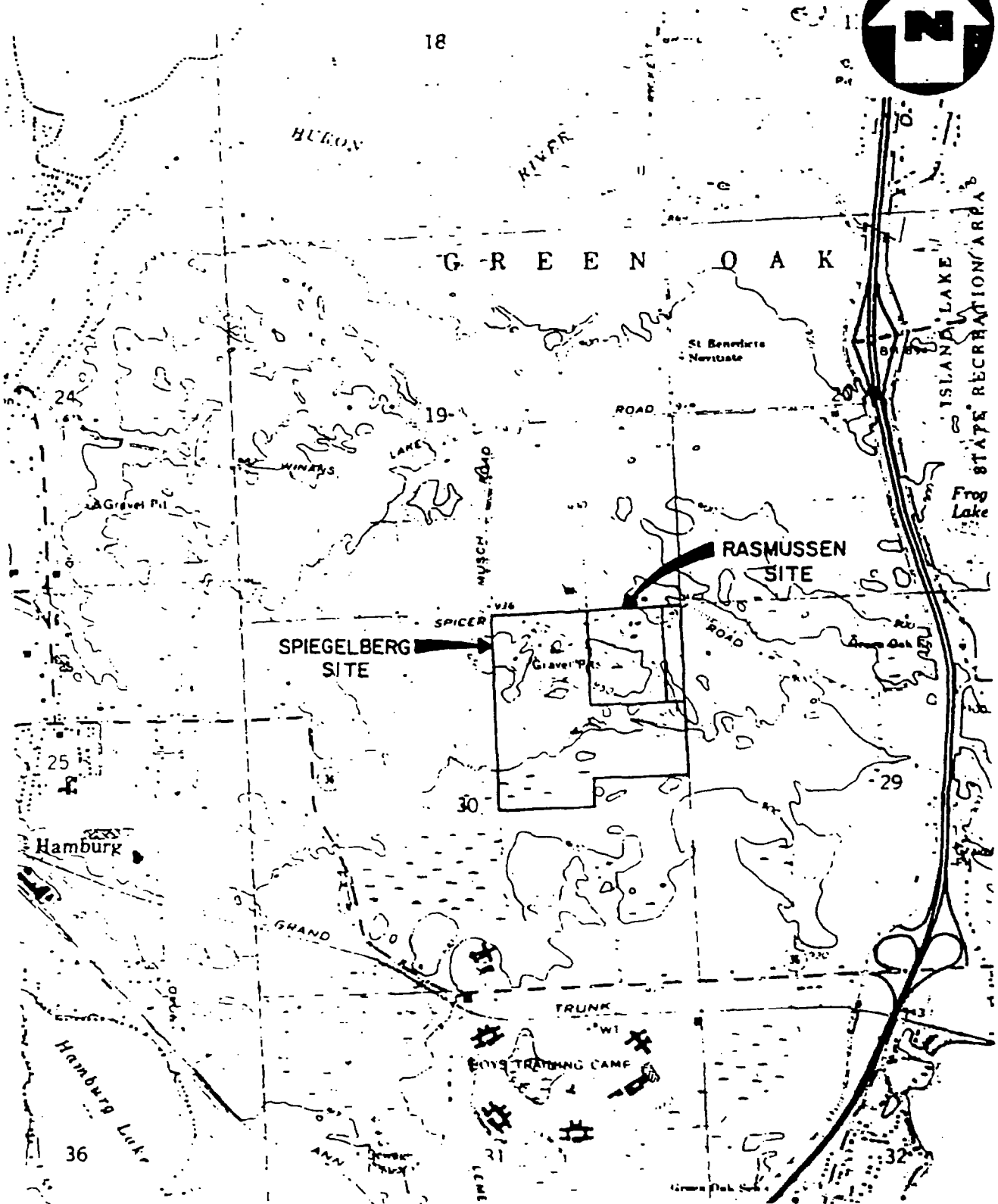
## Summary Of Conversation

*NOISE IS A CONCERN*

## INTERVIEW RECORD

Site Name: <i>RASMUSSEN DUMP</i>		EPA ID No.: <i>MID 095 462 210</i>	
Subject: <i>5-YR REVIEW</i>		Time: <i>4:55 P</i>	Date: <i>6/27/05</i>
Type: <input type="checkbox"/> Telephone <input checked="" type="checkbox"/> Visit <input type="checkbox"/> Other Location of Visit: <i>HOME</i>		<input type="checkbox"/> Incoming <input type="checkbox"/> Outgoing	
Contact Made By:			
Name: <i>HOWARD CAINE</i>		Title: <i>RPM</i>	Organization: <i>US EPA</i>
Individual Contacted:			
Name: <i>[REDACTED]</i>		Title: <i>HOMEOWNERS</i>	Organization:
Telephone No:		Street Address: <i>[REDACTED]</i>	
Fax No:		City, State, Zip: <i>[REDACTED]</i>	
E-Mail Address:			
Summary Of Conversation			
<ul style="list-style-type: none"> <li>• HAD WORK DONE - E. CO21 ONLY, FROM A CRIMOR</li> <li>• CONCERNED ABOUT PROPERTY VALUES</li> </ul>			

EXHIBIT I  
SITE LOCATION MAP



BASE MAP IS A PORTION OF THE U.S.G.S. HAMBURG, MI QUADRANGLE (7.5 MINUTE SERIES, PHOTOREVISED 1975).  
CONTOUR INTERVAL 10'.

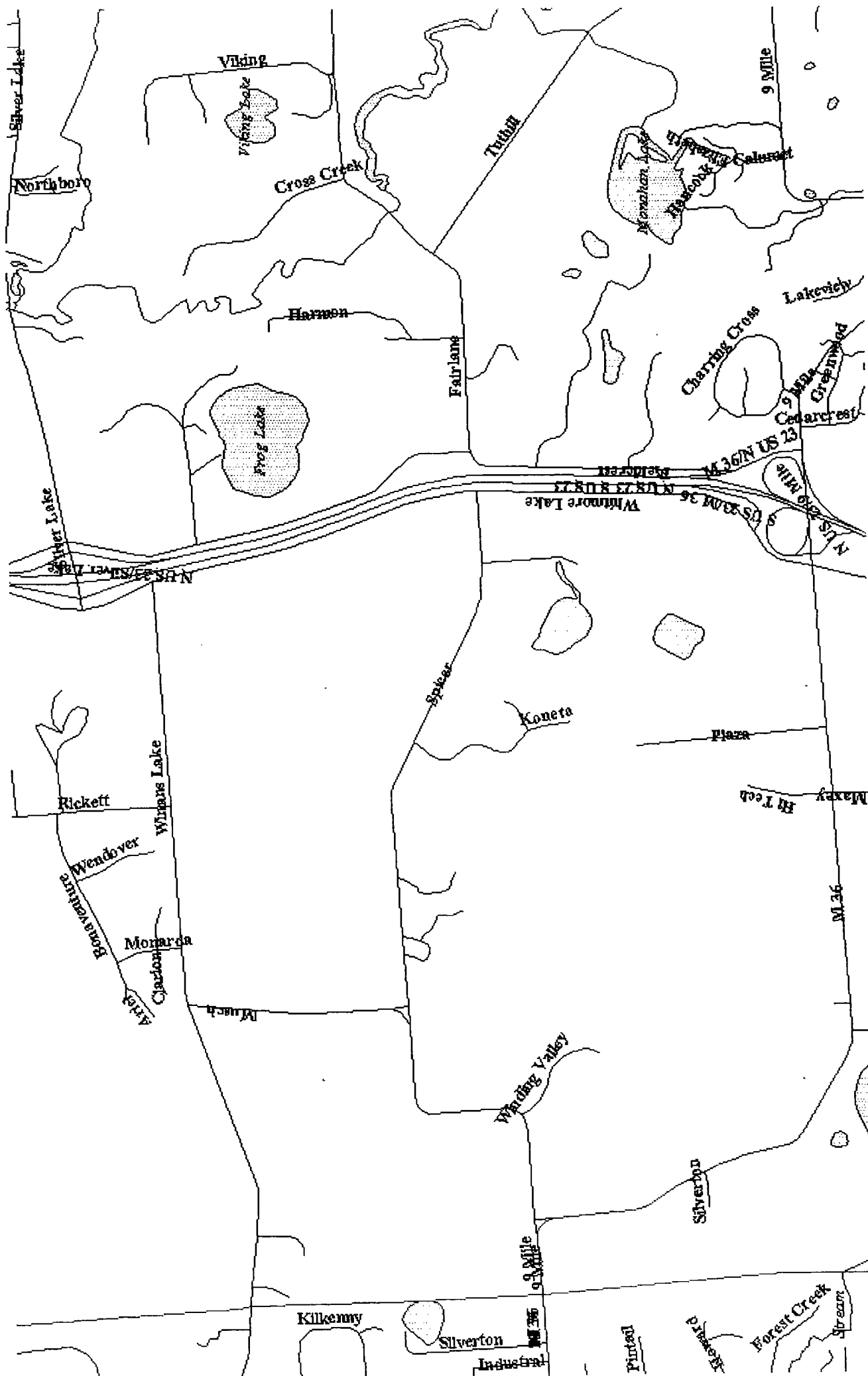
**LOCATION MAP**  
**SPIEGELBERG & RASMUSSEN SITES**  
**LIVINGSTON COUNTY, MI**

SCALE: 1" = 2000'

FIGURE 1-1







## **U. S. Environmental Protection Agency**

is conducting a five-year review of

### **Rasmussen's Dump Superfund Site Green Oak Township, Michigan**

EPA is conducting a five-year review of cleanup at the Rasmussen's Dump Superfund site. The Superfund law requires regular reviews of sites at least every five years where cleanup is done but hazardous waste remains on-site. These five-year reviews are to ensure that the selected plan continues to protect human health and the environment.

EPA selected several cleanup actions. They included:

- ozone treatment of contaminated ground water
- removal of containers and barrels that held hazardous substances
- residential well sampling

The five-year review, which ends Aug. 28, includes a summary of:

- site information
- how the cleanup was done
- how well the cleanup is working
- possible future actions

The cleanup plan may be reviewed at:

Brighton City Library  
100 Library Drive  
Brighton, Mich.

Hamburg City Library  
10411 Merrill Road  
Hamburg, Mich.

EPA Region 5  
Superfund Division  
77 W. Jackson Blvd.  
Chicago, Ill.  
(by appointment)

Comments should be addressed to either person below:

Howard Caine  
Remedial Project Manager  
EPA Superfund Division (SR-6J)  
77 W. Jackson Blvd.  
Chicago, IL 60604  
(312) 353-9685  
caine.howard@epa.gov

Don de Blasio  
Community Involvement  
Coordinator  
EPA Office of Public Affairs (P-19J)  
77 West Jackson Blvd.  
Chicago, IL 60604  
(312) 886-4360  
deblasio.don@epa.gov

Attachment 4



JENNIFER M. GRANHOLM  
GOVERNOR

STATE OF MICHIGAN  
DEPARTMENT OF ENVIRONMENTAL QUALITY  
LANSING



STEVEN E. CHESTER  
DIRECTOR

August 15, 2005

Mr. Howard Caine  
United States Environmental Protection Agency  
Superfund  
77 West Jackson Boulevard (SR-6J)  
Chicago, Illinois 60604

Dear Mr. Caine:

SUBJECT: Second Five-Year Review Report for Rasmussen Dump site, Livingston County, Michigan

Listed below are Michigan Department of Environmental Quality (MDEQ) comments regarding the Second Five-Year Review Report for the Rasmussen Dump Superfund site.

Comment No. 1, Page vi, Issues: Add the following language: *Continuing the quarterly groundwater monitoring program is necessary to evaluate the remedy on an ongoing basis. The monitoring network and sparging system will be modified as necessary to address any changes in the groundwater contaminant plumes.* The above sentences should be added to the "Issues and Recommendations" and "Follow-Up Actions" sections on pages vi and vii, and also on page 25. The June 2005 groundwater analytical results (which may not have been available at the time this report was drafted) indicate that vinyl chloride concentrations exceed criteria at the location of well 81-4, which is on the Rasmussen and Spiegelberg property boundary line. There is no monitoring down-gradient of this location. In addition, vinyl chloride concentrations have doubled at the location of CRA-RA-27 in the past two years, and contaminant concentrations at the location of CRA-RA-5 have also increased recently, but are still below criteria. Because of the increasing trend and contaminant concentrations in this portion of the southern plume and lack of down-gradient monitoring, it is recommended that the monitoring network be expanded in this area of the site to delineate the groundwater plume migrating onto the Spiegelberg property.

Comment No. 2, page 2, first paragraph: This is a typographical error. Delete the word "are" in the next to last line of this paragraph.

Comment No. 3, page 2, Table 2: The date of the RI/FS listed in Table 2 is not consistent with the text on page 4, last full paragraph and partial paragraph.

Comment No. 4, page 2, "Physical Characteristics" section: The surrounding properties are described as "woods, open fields, and rural." It should be noted that the adjacent Spiegelberg property is an active gravel mining operation and a Superfund site.

Comment No. 5, page 3, "Groundwater" section: This is also a global comment for the report. It is recommended that the "Groundwater" subsection and other subsections of this report be underlined to identify them as such.

Comment No. 6, page 4, next to last paragraph: The PRP acronym needs to be defined, as does the ROD acronym on page 5, and the PDSLD acronym on page 6.

Comment No. 7, page 5, first paragraph: This is a typographical error. The word "solid" in line two should be changed to "soil."

Comment No. 8, page 8 through page 17: The "System Operation and Maintenance" section of this report begins on page 8, and various subsections follow, such as the "ozone sparging system refinements" subsection included on pages 10 and 11, and "vertical aquifer sampling" (VAS) subsection on pages 11 through 13, etc. Because refinements to the ozone sparging system may be necessary at some point and additional VAS borings and monitoring points are also likely, it is recommended that each subsection be ended with a statement to the effect that "On-going evaluation of the sparging system, groundwater plumes, and monitoring locations utilized or required for quarterly monitoring may result in modifications to these systems."

Comment No. 9, page 7, last paragraph of the "Remedy Selection" section, eighth line: This is a typographical error. A semi-colon is needed after the word "soil."

Comment No. 10, page 9, third paragraph of "Ozone Sparging System" subsection: This is a typographical error. The word "be" should be deleted from the last line.

Comment No. 11, page 10, second paragraph, lines two and three: The sentence is not correctly developed and currently hard to understand.

Comment No. 12, page 18, "Landfill O&M" section: It should be noted that during the site visit, small areas of settling of the landfill cap were observed around a few wells, and cattails appeared to be growing in those settled areas. A statement and timetable should be added indicating *these areas will be evaluated and corrective actions will be completed, if necessary.*

Comment No. 13, page 22, "Data Review" section:

First Bullet: As a whole, the northern plume appears to be generally stable; however, the additional investigations conducted since the last Five-Year Review support that the plume has indeed changed somewhat, expanding in areas, with increasing or decreasing contaminant concentrations in others. ~~The being said,~~ it is misleading to say the contaminant concentrations are "decreasing." It is recommended the word "decreasing" be deleted and the word "generally" be inserted before "stable."

Fourth Bullet: Additional data is needed to define the extent of contamination that has migrated onto the Spiegelberg property, beyond the location of 81-4. Additionally, the vinyl chloride concentrations detected in groundwater collected from CRA-RA-27 have increased significantly since 2004. A more accurate characterization of the southern vinyl chloride plume is necessary and should be inserted as the fourth bullet, replacing the existing language. As stated previously, it would be a good idea to recognize that modifications to the monitoring and sparging networks may be necessary throughout the long-term monitoring.

Fifth Bullet: For the reasons outlined above in the first and fourth bullets, this bullet should be deleted.

Comment No. 14, page 25, Sections VIII and IX: See Comment No. 1.

Comment No. 15, page 25, Section X: It is stated that the "source of contamination has been removed." The word "contained" is more accurate and should be used in substitution for "removed." Also, data indicates that the southern plume likely extends onto the Spiegelberg property; therefore, it is not accurate to state that groundwater contamination remains on-site. Finally, in order for the remedy to be protective in the short and long term, quarterly groundwater monitoring is necessary. The Protectiveness Statement should be modified to include this need. It is also recommended that the annual residential well sampling be mentioned. This may be an appropriate place to recognize that.

Comment No. 16: The groundwater analytical data results that follow page 25 should be updated to show the most recent data, derived from the June 2005 sampling event. This data, for example, indicates that the vinyl chloride detected at the location of 81-4 (southern plume) now exceeds applicable criteria.

Comment No. 17: During the course of this review, the MDEQ was unable to find geologic cross-sections depicting subsurface conditions, diagrams showing depth of screen within the aquifer and contaminant concentrations, etc., which would make understanding of the data much easier. Based on our review, it appears that the well screen for CRA-RA-7 (and possibly a few others) is not screened at the appropriate depth in the aquifer. This raises legitimate questions regarding the appropriateness of using data obtained from those locations. Because it appears as though an additional monitoring point is necessary down-gradient of 81-4, it is recommended that the screen placement of CRA-RA-7 be reviewed at that time as well, and review the adequacy of other monitoring points used to delineate the extent of contamination.

It should be noted that a recent review of literature by MDEQ staff regarding the simulprobe vertical aquifer sampling technology used at this site, suggests that data collected using this method may not adequately represent aquifer conditions. Reportedly, there is significant potential for volatile losses from groundwater in the sampling apparatus before the sample is collected. In addition, when profiling is conducted in 10-foot intervals as it was at the Rasmussen site, only a fraction of the aquifer is evaluated. It is recommended that a more appropriate vertical aquifer sampling technique be used at this site.

Please contact me at the number listed below if you have any questions.

Sincerely,



Keith M. Krawczyk  
Project Manager  
Specialized Sampling Unit  
Superfund Section  
Remediation and Redevelopment Division  
517-335-4103

cc: Mr. Jatinder Singh, U.S. EPA  
Mr. James Mayka, U.S. EPA  
Ms. Elizabeth M. Browne, MDEQ  
Ms. Daria W. Devantier, MDEQ  
Mr. John Bradley, MDEQ

## Attachment 5



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF

SR-6J

June 22, 2005

**CERTIFIED MAIL**  
**RETURN RECEIPT REQUESTED**

Steven C. Nadeau, Esq.  
Counsel for the Rasmussen Site  
Remediation Group  
Honigman, Miller, Schwartz & Cohn  
2290 First National Building  
660 Woodward Avenue  
Detroit, MI 48226-3583

Jeffrey R. Bartholomy  
Project Manager  
Conestoga-Rovers & Associates  
14496 Sheldon Road, Suite #200  
Plymouth, MI 48170

Re: Rasmussen Dump Superfund Site; Request for Institutional Control Study  
Livingston County, Michigan; Civil Action No. 92-40071

Dear Messrs. Nadeau and Bartholomy:

The U.S. Environmental Protection Agency ("EPA") is undertaking an initiative to evaluate institutional controls ("ICs") at Superfund sites. ICs may be needed to restrict uses of sites where on-site hazardous substances remain above levels that allow for unlimited use and unrestricted exposure. ICs may be necessary to prevent interference with Superfund remedy components. A description of EPA's IC initiative may be found in "Strategy to Ensure Institutional Control Implementation at Superfund Sites," OSWER No. 9355.0-106 (2004), <http://www.epa.gov/superfund/action/ic/strategy.htm>.

EPA is seeking the cooperation of potentially responsible parties as part of this nationwide effort. The purpose of this letter is to seek your assistance in evaluating ICs for the Rasmussen Superfund Site ("the Site"), located at Hamburg, Michigan. Specifically EPA is requesting that you submit an IC investigation/study to EPA within **45 days of receipt of this letter**. Please provide EPA with a notice of intent to comply with this request **within 10 days of the date of receipt of this letter**.

The IC investigation/study will be used by EPA in its current review of the remedial action for the Site pursuant to Section 121 of the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9621. Section 121 of CERCLA mandates that, no less often than every five years, EPA must review remedial actions where hazardous substances, pollutants or contaminants remain in place

to assure that human health and the environment is being protected by the remedial action.

As you know, the Rasmussen Site Remediation Group (“RSRG”) has implemented a remedial action for the Site pursuant to Consent Decree, Civil Action No. 92-40071, (“Consent Decree”). The Site remedy does not allow unlimited use and unrestricted exposure. The long term protectiveness, effectiveness and integrity of the remedy depends on compliance with ICs that implement the following land/groundwater restrictions:

Examples:

<b>Restricted Areas</b> (Areas that do not allow unlimited use or unrestricted exposure)	<b>Institutional Control Objective/Restriction/Performance Standard</b>
Area of the Site where soil has been remediated to commercial/industrial cleanup levels	Prohibit residential use of the areas
Site remedial components: e.g., groundwater pump and treat system	Prohibit interference with the system
Area of the Site where the groundwater plume exceeds MCLs	Prohibit consumptive use of the groundwater plume area until MCLs are achieved
Area of Site with RCRA Subtitle C or D landfill cap	Prohibit interference with the cap

Under paragraph 19 of Section VIII (Periodic Review) of the Consent Decree, the RSRG has agreed to implement studies and investigations in order to permit EPA to conduct reviews of whether the remedial action is protective of human health and the environment. The IC investigation/study is necessary for EPA to conduct its review of whether the remedial action is protective of human health and the environment.

The goals of the IC investigation/study are: a) to evaluate whether institutional controls currently exist that adequately implement the objectives/performance standards described above; b) identify and recommend any corrective measures to existing ICs necessary for their effectiveness; and c) to recommend any new or additional ICs necessary to achieve and maintain the objectives/performance standards described above.

### **IC Study Report Requirements**

Within 45 days of receipt of this letter, please submit a draft IC investigation/study report to EPA for review and approval that includes the following minimum requirements:

1. **Current Map of Restricted Areas:** Provide a map that identifies the current boundaries of the restricted areas (that do not allow unlimited use and unrestricted exposure), boundaries of the Site, streets, easements, property ownership, and assessor’s parcel number or other recorded plat or survey information;

2. **GIS Information:** Provide Geographic Information System (“GIS”) coordinates that show the current boundaries of restricted areas and boundaries of the Site. Identify the accuracy of the coordinates (i.e. within 0.01 feet). A licensed surveyor shall provide certification that all coordinates are accurate within 0.01 feet. Please format the coordinates of the restricted areas and boundaries into an ESRI polygon-shape file. The shape file shall be projected into the UTM, and boundaries into an ESRI polygon-shape file. The shape file shall be projected into the UTM, NAD 83 projection system. Provide an attribute name in the shape file for each polygon submitted. For example: “site boundary”, “no restrictions”, “recreational only”, “industrial only”;
3. **Documentation on Existing Proprietary Controls:** Provide copies by the Recorder of Deeds (or other appropriate land records office) showing the clerk’s recording stamps of existing proprietary controls (environmental restrictive covenants/easements etc.) for the restricted areas described above. Provide an aerial map that depicts the boundaries of the restricted area covered by the existing proprietary control, streets, easements, property ownership, and parcel numbers. Assess and discuss whether the boundaries of the area covered by existing proprietary controls match the boundaries of restricted areas based on current information;
4. **Assessment of Existing Proprietary Controls:**
  - a. Title Evaluations:
    - i) Obtain from a title company a title insurance commitment using ALTA Commitment Form 1982 as amended “for information only purposes” for the restricted areas. Include copies of documents referenced in the title commitment. Include copies of encumbrances, utility right of ways, leases, and subleases impacting restricted areas;
    - ii) Discuss whether the title commitment identifies/exempts existing proprietary controls for restricted areas;
    - iii) Provide an aerial map that identifies parcel numbers and boundaries of current encumbrances (such as utility easements) that impact restricted areas. Discuss efforts to obtain subrogation agreements for such encumbrances. Include copies of subrogation agreements that have or will be obtained for such encumbrances.
  - b. Assess and discuss whether existing proprietary controls have been executed in a legally enforceable manner. Discuss whether a grantee or prior owner “holds” the proprietary controls. Discuss whether the current owner is under an obligation for compliance with the land and

prior owner “holds” the proprietary controls. Discuss whether the current owner is under an obligation for compliance with the land and groundwater restriction described above. Discuss whether existing proprietary controls “run with the land” (i.e. restrictions are binding on subsequent property owners). Discuss whether existing proprietary controls implement the IC objectives/performance standards described above.

5. **Documentation on Government Controls:** Identify and provide a current, dated and official copy of existing governmental controls [ordinance, statutes, etc.] that implement the IC objectives/performance standards for the restricted areas described above. Discuss whether the governmental control restricts all areas of unlimited use and unrestricted exposure at the Site. Indicate whether the governmental control contains a figure showing the current boundaries of the unrestricted areas based on most recent information? Indicate where to obtain information about the governmental control [ordinance]? Explain how affected parties such as homeowners, contractors and resource users can obtain information about the governmental control? Indicate whether the governmental agency has up-to-date maps of restricted areas? If such map is available, secure and provide a copy. Discuss whether affected parties and resource users are aware of and understand the restrictions described above? Have there been breaches of the use restriction described above? If so, how were they addressed by the governmental agency?
6. **Discuss compliance with Institutional Controls:** Discuss whether the property is being used in a manner consistent with the restrictions in the Consent Decree. Conduct site inspections and interviews with owners, lessees and other holders of property interests, and summarize the results. Indicate whether owners, lessees and other holders of property interests aware of and complying with the restrictions? Indicate whether land use or expected land use on or near the site has changed since execution of the ROD, Explanation of Significant Differences (“ESD”) and ROD Amendment? Indicate whether there are any new developments, either constructed or planned, in the area? Indicate whether there are any new construction permits pending? Indicate whether the property owner has any plans to sell or transfer the property?
7. **Assess monitoring:** Discuss how, when, and by whom compliance with the institutional controls is monitored. Discuss whether the results of the IC monitoring are routinely and promptly shared with EPA and the State. Discuss whether there are measures in place to ensure that modifications to the restriction require EPA and the State approval;
8. **Discuss effectiveness of Institutional Controls:** Discuss whether existing ICs are preventing exposure to hazardous wastes, pollutants or contaminants. Discuss whether there is potential human or ecological exposure. Discuss whether land and/or resource use has changed since execution of the ROD, ESD and ROD

assumptions and risk calculations. Discuss whether there are any unintended consequences resulting from the use of a particular restriction. Assess whether the controls (or lack of controls) are effective in the short term in maintaining land/groundwater restrictions above, maintaining performance standards and preventing exposure. Assess whether the control (or lack of controls) will be effective in the long term in maintaining the land and groundwater restrictions above, maintaining remedy performance standards and preventing exposure;

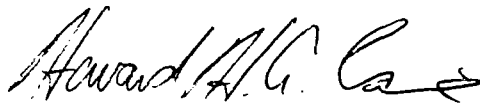
9. **Recommendations:** Propose any corrections to existing institutional controls that are necessary to ensure that the land and groundwater use restrictions described, above, are implemented correctly, are maintained and will be protective in the short term and the long term. Propose controls for remaining areas that do not support unlimited use and unrestricted exposure, but are not covered by existing controls. Include a title commitment for any proposed proprietary control. Propose subrogation agreements for any encumbrance that negatively impacts restricted areas. Propose subrogation agreements for any encumbrance that negatively impacts restricted areas. Propose monitoring requirements and modifications to the Operation and Maintenance Plan to ensure that ICs are maintained and complied with in the short term and in the long term. The monitoring plan must include a schedule and an annual certification to EPA that ICs are in place and remain effective.

Please provide EPA with a notice of intent to comply with this request **within 10 days of the date of receipt of this letter**. If you have any questions concerning this request, please contact either of us at the telephone numbers given below.

Sincerely,



Cynthia Kawakami  
Associate Regional Counsel  
Office of Regional Counsel  
(312) 886-0564



Howard Caine  
Remedial Project Manager  
Superfund Division  
(312) 353-9685

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# HONIGMAN

Honigman Miller Schwartz and Cohn LLP  
Attorneys and Counselors

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*Via E-Mail*

July 11, 2005

Cynthia Kawakami  
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U.S. EPA  
77 West Jackson Blvd.  
Chicago, IL: 60604-3590

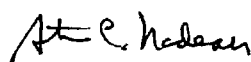
***Re: Rasmussen Dump Superfund Site; Request for Institutional Control Study  
Livingston County, Michigan Civil Action No. 92-40071***

Dear Ms. Kawakami:

This letter serves as the Rasmussen Site Remediation Group's ("RSRG") notice to comply with the U.S. EPA's request for certain information in connection with their evaluation of institutional controls at the Rasmussen Dump Site.

Very truly yours,

HONIGMAN MILLER SCHWARTZ AND COHN LLP



Steven C. Nadeau

c: Howard Caine, U.S. EPA RPM  
Jeffrey R. Bartholomy

DETROIT.1839276.1

Attachment 6

### **Documents Reviewed**

Record of Decision (ROD)

Explanation of Significant Difference

First Five-Year Review

ROD Amendment

Quarterly Progress Reports Nos. 69 - 91, Groundwater and Landfill Remedial Design/Remedial Action

Site Investigation Reports

Vertical Aquifer Sampling and Ozone Sparging Reports

Demonstration of Compliance, Soil Flushing-PDSLD/IW Area